Amateur Radio

CQ

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MAY 1982 $2.00

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THE RADIO AMATEUR'S JOURNAL

NEW

"DX-traordinary."

Superior dynamic range, auto. antenna tuner, QSK, dual NB, 2 VFO's, general coverage receiver.

TS-930S

The TS-930S is a superlative, high performance, all-solid state, HF transceiver keyed to the exacting requirements of the DX and contest operator. It covers all Amateur bands from 160 through 10 meters, and incorporates a 150 kHz to 30 MHz general coverage receiver having an excellent dynamic range.

Among its other important features are, SSB slope tuning, CW VBT, IF notch filter, CW pitch control, dual digital VFO's, CW full break-in, automatic antenna tuner, and a higher voltage operated solid state final amplifier. It is available with or without the AT-930 automatic antenna tuner built-in.

TS-930S FEATURES:

- **160-10 Meters, with 150 kHz - 30 MHz general coverage receiver.**
  Covers all Amateur frequencies from 160-10 meters, including new WARC, 30, 17, and 12 meter bands, on SSB, CW, FSK, and AM. Features 150 kHz - 30 MHz general coverage receiver. Separate Amateur band access keys allow speedy band selection. UP/DOWN bandswitch changes in 1-MHz steps. A new, innovative, quadruple conversion, digital PLL synthesized circuit provides superior frequency accuracy and stability, plus greatly enhanced selectivity.
- **Excellent receiver dynamic range.**
  Receiver two-tone dynamic range, 100 dB typical (20 meters, 500 Hz CW bandwidth, at sensitivity of 0.25 μv, S/N 10 dB), provides the ultimate in rejection of IM distortion.
- **All solid state, 28 volt operated final amplifier.**
  The final amplifier operates on 28 VDC for lowest IM distortion. Power input rated at 250 W on SSB, CW, and FSK, and at 80 W on AM. Final amplifier protection circuit with cooling fan, SWR/Power meter built-in.
- **Automatic antenna tuner, built-in.**
  Available with AT-930 antenna tuner built-in, or as an option. Covers Amateur bands 80-10 meters, including the new WARC bands. Tuning range automatically pre-selected with band selection to minimize tuning time. "AUTO-THRU" switch on front panel.
- **CW full break-in.**
  CW full break-in circuit uses CMOS logic IC plus reed relay for maximum flexibility, coupled with smooth, quiet operation. Switchable to semi-break-in.
- **Dual digital VFO's.**
  10-Hz step dual digital VFO's include band information. Each VFO tunes continuously from band to band. A large, heavy, flywheel type knob is used for improved tuning ease. T.F. Set switch allows fast transmit frequency setting for split-frequency operations. A=B switch for equalizing one VFO frequency to the other. VFO "Lock" switch provided. RIT control for ±9.9 kHz receive frequency shift.
- **Eight memory channels.**
  Stores both frequency and band information. VFO-MEMO switch allows use of each memory as an independent VFO, (the original memory frequency can be recalled at will), or as a fixed frequency. Internal Battery memory back-up, estimated 1 year life. (Batteries not Kenwood supplied).
- **Dual mode noise blanker ("pulse" or "woodpecker").**
  NB-1, with threshold control, for pulse-type noise. NB-2 for longer duration "woodpecker" type noise.
- **SSB IF slope tuning.**
  Allows independent adjustment of the low and/or high frequency slopes of the IF passband, for best interference rejection.
- **CW VBT and pitch controls.**
  CW VBT (Variable Bandwidth Tuning) control tunes out interfering signals. CW pitch controls shifts IF passband and simultaneously changes the pitch of the beat frequency. A "Narrow/Wide" filter selector switch is provided.
- **IF notch filter.**
  100-kHz IF notch circuit gives deep, sharp, notch, better than -40 dB.
- **Audio filter built-in.**
  Tuneable, peak-type audio filter for CW.
- **AC power supply built-in.**
  120, 220, or 240 VAC, switch selected (operates on AC only).
- **Fluorescent tube digital display.**
  Fluorescent tube digital display has analog type sub-scale with 20-kHz steps. Separate 2 digit display indicates RIT frequency shift.
- **RF speech processor.**
  RF clipper type processor provides higher average "talk-power", plus improved intelligibility. Separate "IN" and "OUT" front panel level controls.
- **One year warranty.**
  The TS-930S carries a one year limited warranty on parts and labor.

Other features:

- SSB monitor circuit, 3 step RF attenuator, VOX, and 100-kHz marker.

Optional accessories:

- AT-930 automatic antenna tuner.
- SP-930 external speaker with selectable audio filters.
- YG-455C-1 (500 Hz) or YG-455CN-1 (250 Hz) plug-in CW filters for 455-kHz IF.
- YK-88C-1 (500 Hz) CW plug-in filter for 8.83-MHz IF.
- YK-88A-1 (6 kHz) AM plug-in filter for 8.83-MHz IF.
- MC-60 (S-8) deluxe desk microphone with UP/DOWN switch.
- TL-922A linear amplifier.
- SM-220 station monitor.
- HC-10 digital world clock.
- HS-6, HS-5, HS-4 headphones.

More information on the TS-930S is available from all authorized dealers of Trio-Kenwood Communications
1111 West Walnut Street,
Compton, California 90220

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Specifications and prices are subject to change without notice or obligation.

Watt's new...on 2 meters?

All mode (FM/SSB/CW) 25 watts, plus...!!!

TR-9130

The TR-9130 is a powerful, yet compact, 25 watt FM/USB/LSB/CW transceiver providing increased versatility of operation on the two meter band. It features six memories, memory scan, memory back-up capability, automatic band scan, all-mode squelch, CW semi break-in, and incorporates microprocessor technology. It is available with a 16-key autopatch UP/DOWN microphone (MC-46), or a basic UP/DOWN microphone.

TR-9130 FEATURES:

- **25 Watts RF output**
  All modes, (FM/SSB/CW), utilize a new high power linear module, for more reliable FM operation and increased DX on SSB or CW.
- **FM/USB/LSB/CW all mode operation**
  For added convenience in all modes of operation, the mode switch, in combination with the digital step (DS) switch, determines the size (100 Hz, 1 kHz, 5 kHz, 10 kHz) of the tuning step, and the number of digits displayed.
- **Six memories**
  On FM, memories 1 through 5 for simplex or ±600 kHz offset, with the OFFSET switch. Memory 6 for non-standard offset. All six memories may be operated simplex, any mode.
- **Memory scan**
  Scans memories in which data is stored. Stops on busy channels.
- **Internal battery memory back-up**
  With 9 volt Ni-Cd battery installed, (not KENWOOD supplied), memories will be retained approximately 24 hours, adequate for the typical move from base to mobile. A terminal is provided on the rear panel for connecting an external back-up supply.
- **Automatic band scan**
  Scans within whole 1 MHz segments (ie., 144.0-144.999 MHz), for improved scanning efficiency.
- **Dual digital VFO's**
  Incorporates two built-in digital VFO's, selected through use of the A/B switch, and individually tuned.
- **Transmit frequency tuning for OSCAR operations**
  On SSB or CW, the tuning knob or UP/DOWN buttons on the microphone may be used to adjust the transmit frequency during transmission.
- **16-key autopatch UP/DOWN microphone version**
  The TR-9130 is available with the MC-46 16-key autopatch UP/DOWN microphone, or with the basic UP/DOWN microphone. Manual UP/DOWN scan of entire band possible using either microphone.
- **Squelch circuit on all modes (FM/SSB/CW)**
  The squelch circuit is effective on SSB, CW, and FM.
- **Repeater reverse switch**
  For checking signals on the repeater input, on FM.
- **Tone switch**
  For activating a tone device, (not KENWOOD supplied).
- **CW semi break-in circuit with sidetone**
  Built-in, for convenience in CW operations.
- **Digital display with green LED's**
- **High performance receive-transmit design**
  The use of a low-noise dual-gate MOSFET plus two monolithic crystal filters in the receiver front-end results in excellent two signal characteristics. Care in transmitter design assures clean signals in all modes.
- **Compact size and light weight**
  170 (6-11/16) W x 68 (2-11/16) H x 241 (9-1/2) D mm (inch), 2.4 kg (5.3 lbs.) weight.
- **Extended frequency range**
  Covers 143.9 to 148.9999 MHz, which includes certain MARS and CAP frequencies.
- **Transmit offset switch**
- **High performance noise blanker**
  Suppresses pulse-type noise on SSB and CW.
- **RF gain control**
  For all modes of operation.
- **RIT (Receiver Incremental Tuning) circuit**
  Useful during SSB/CW operations.
- **Amplified AGC**
  Enhances SSB and CW operation. The AGC time constant is automatically optimized for each mode of operation.
- **HI/LOW power switch**
  Selects 25 or 5 watts RF output on FM or CW.
- **Accessory terminal**
  A four pin accessory terminal is provided for use with a linear amplifier or other accessory.
- **Quick release mounting bracket** (Supplied)

More information on the TR-9130 is available from all authorized dealers of Trio-Kenwood Communications 1111 West Walnut Street, Compton, California 90220.

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Accessories:

- KPS-7 Fixed station power supply.
- TK-1 AC adapter for memory back-up.

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NEW

Small talk.

Processor, IF shift, N/W switch, affordable

TS-130SE

An incredibly compact, full-featured, reasonably priced, all solid-state HF SSB/CW transceiver for both mobile and fixed operation. It covers 3.5 to 29.7 MHz (including the three new Amateur bands) and features digital display, IF shift, speech processor, and narrow/wide filter selection on both SSB and CW.

TS-130SE FEATURES:

- **80-10 meters, including three new bands**
  Covers all Amateur bands from 3.5 to 29.7 MHz, including the new 10, 18, and 24-MHz bands. Receives WWV on 10 MHz. VFO covers more than 50 kHz above and below each 500-kHz band.
- **Two power versions...easy operation**
  TS-130SE runs 200 W PEP/160 W DC on 80-15 meters, and 160 W PEP/140 W DC on 12 and 10 meters. TS-130V runs 25 W PEP/20 W DC input on all bands. Solid-state, wideband final amplifier eliminates transmitter tuning; receiver wideband RF amplifiers eliminate preselector peaking.
- **Digital display built-in**
  Six-digit green fluorescent tube display indicates operating frequency to 100 Hz, external VFO or fixed-channel frequency, RIT shift, and CW transmit-receive shifts. Analog subdial back-up.
- **Built-in Speech Processor**
  Increases audio punch and average SSB output power.
- **IF shift circuit**
  Very effective in eliminating interfering signals, by placing them outside the IF passband.
- **CW narrow/wide selection**
  "N-W" switch allows selection of wide or narrow bandwidths. Wide CW and SSB bandwidths are the same. Optional YK-88C (500 Hz) or YK-88CN (270 Hz) filter may be installed for narrow CW.
- **SSB narrow selection**
  "N-W" switch allows selection of narrow SSB bandwidth to eliminate QRM, when optional YK-88SN (1.8 kHz) filter is installed. (CW filter may still be selected in CW mode.)
- **Sideband mode selected automatically**
  LSB on 40 meters and below; USB on 30 meters and above. SSB REVERSE position on MODE switch.
- **RF Attenuator, built-in**
  Allows optimum rejection of IM distortion.
- **Single conversion PLL system**
  Provides improved stability and spurious characteristics.
- **Protection circuit for final amplifier.**
  For maximum reliability, the final amplifier is protected by circuitry that monitors VSWR and temperature. (TS-130V, VSWR only.) Output power is reduced when abnormal operating conditions occur. If especially severe operation is anticipated, optional cooling fan, model FA-4, may be added. Model TS-130S, with FA-4 installed, is also available.
- **Effective noise blanker**
  Eliminates pulse-type noise.
- **Compact and lightweight**
  Only 3-3/4 H x 9-1/2 W x 11-9/16 D (inches); weight 12.3 lbs.
- **Other important features include:**
  VOX for SSB, CW semi break-in with sidetone, one fixed channel, and 25 kHz marker.

Optional DFC-230 Digital Frequency Controller
Allows frequency control in 20-Hz steps with UP/DOWN microphone (supplied with DFC-230). Includes four memories (handy for split-frequency operation) and digital display. Covers 100 kHz above and below each 500-kHz band. Very compact.

More information on the TS-130 Series is available from all authorized dealers of

Trio-Kenwood Communications
1111 West Walnut Street
Compton, California 90220.

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Matching accessories for fixed station operation:

- PS-30 base station power supply (remotely switchable ON or OFF with TS-130SE power switch).
- SP-120 external speaker
- VFO-120 remote VFO
- MC-50 50kΩ/500Ω desk microphone

Other accessories not shown:

- FA-4 fan unit for TS-130SE
- YK-88C (500 Hz) and YK-88CN (270 Hz) CW filters
- YK-88SN (1.8 kHz) narrow SSB filter
- AT-130 compact antenna tuner (80-10 meters, including 3 new bands)
- MB-100 mobile mounting brackets
- KPS-21 base station power supply (also for TS-130SE)
- TL-922A linear amplifier
- PS-20 base-station power supply for TS-130V
- PC-1 phone patch
- HC-10 world digital clock
- MC-30S and MC-35S noise cancelling hand microphones
- MC-60 deluxe desk microphone
- SP-40 compact mobile speaker
- HS-4, HS-5, and HS-6 headphones

Specifications and prices are subject to change without notice or obligation.

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R-1000
$30.00 OFF

$ CASH NOW! $

ASK YOUR DEALER FOR DETAILS

TR-7730
$30.00 OFF
WITH OR WITHOUT
MC-46

TS-130SE or TS-130S
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*Interim Dealers

SAVE NOW!

BONUS BUCKS

This KENWOOD BONUS BUCKS coupon, when presented to any factory authorized dealer of TRIO-KENWOOD COMMUNICATIONS products, may be used as partial payment in the amount of $30.00 toward the purchase of any new KENWOOD model R-1000, TR-8400, or TR-7730 with MC-46 or basic UP/DOWN microphone, or may be used as partial payment in the amount of $15.00 toward the purchase of any new KENWOOD model TS-130S, TS-130SE, or TS-530S amateur radio product. The purchase must be made during the period March 1, through June 15, 1982. The customer must present a separate coupon (one only) for each of the listed models being purchased. Additional coupons are available from our authorized dealers. TRIO-KENWOOD assumes no responsibility for the inability of any of its dealers or of itself to deliver any specific product within the period specified in the foregoing. Offer valid only in the U.S.A. Void where taxed or prohibited by law. Resellers are not eligible to participate in this program. This coupon is a part of TRIO-KENWOOD COMMUNICATIONS "BONUS BUCKS" sales program. It has no value unless submitted in compliance with the rules of that program prior to June 15, 1982.

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Q-BB/82

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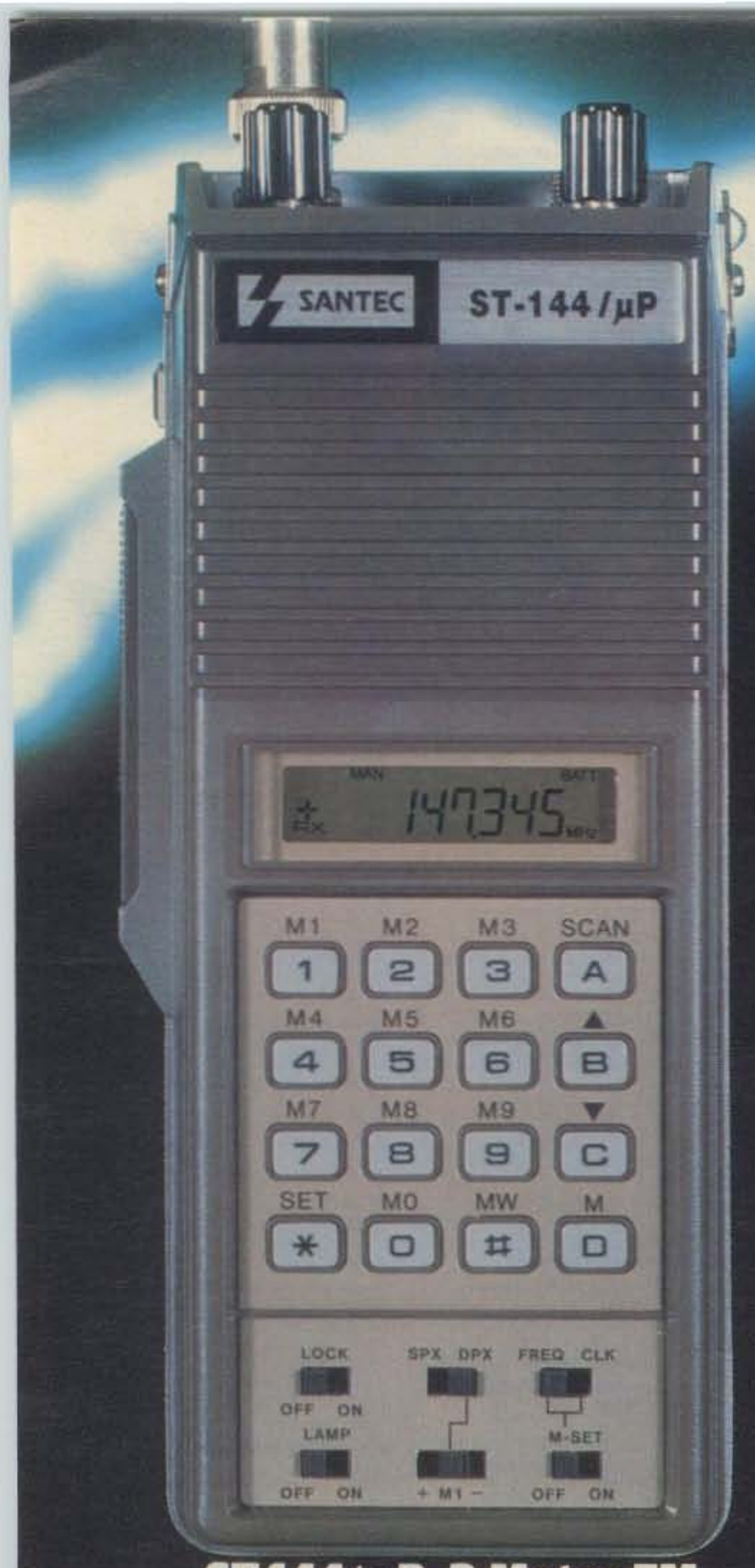


ST-144/μP, 2 Meter FM

It's Time!

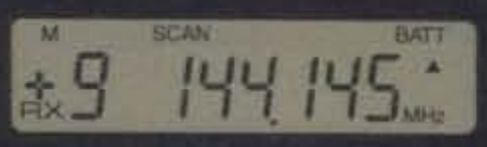
■ It's time you got your share of the excitement of full-feature synthesized handheld operations. ■ SANTEC(nology zaps to the lead of the state-of-the-art in 2 meter handhelds with the new ST-144/μP. ■ Only SANTEC hands you all the up-to-the-minute features of this "clockwise" precision jewel.

■ The 24 hour format digital clock on the LCD display is uniquely SANTEC, and it typifies the thoughtful operator-oriented design incorporated throughout the ST-144/μP. ■ Not only does it give you accurate time checks whenever you want, but also it can display the time instead of the frequency, while this handful of radio continues to operate on your "favorite" frequency.

24 Hr Clock provides time of day even while the radio is turned off, or it can be selected by the front panel switch while in QSO.

Full Frequency Display showing offset selected, battery condition and current scan mode. At turnon, the contents of M-1 are loaded into the operating register, and the display looks like this.

The Memory Mode is indicated by the small "M" above " + " the "5" indicates that the data were stored in Memory 5 before recall. The " + " indicates that the + offset was stored with the frequency.



Memory Scan with "Priority Scan / Auto-Resume" has stopped on Memory 9 to listen for a few seconds.

Transmit is indicated on a minus 600 kHz offset from 146.820 MHz which was stored in M-6. Activity on Memory 6 was found by using the "Search" mode of Scan.

■ The 10 frequencies that you put into the memories are stored with your repeater offsets, and you can have them scanned, searched or instantly recalled at the touch of a button. ■ Memory 1 even gets priority treatment in the memory scan mode. ■ That's timely complexity made amazingly simple: and the high power option of 3.5W (nominal) is simply the greatest reach you've ever held in your hand.

■ "Battery saver" function by the computer to hoard battery power when the frequency is quiet ■ Programmed limits for both ends of bandscan ■ Simplified frequency entry only by keyboard ■ Full capacity, low impedance audio output to drive an external speaker ■ Wide band span for MARS, CAP, AF MARS: 142.00-149.995 MHz ■ Quick-change 500mAh battery ■ Separate level controls for MIC, TT, PL and DEV ■ & so much more that we don't have space to mention ■ SANTEC hands it all over, while others can't even give you the time of day.

All stated specifications are subject to change without notice or obligation.

Accessories for SANTEC Handheld Radios
clockwise from upper left:
Leather Case (ST-LC)
Base Charger & Power Supply (ST-5BC)
Remote Speaker (MS-50S)
Mobile Charger (ST-MC)
Speaker Microphone (SM-1)

Sale of the ST-144/μP is subject to FCC certification: approval and availability expected January, 1982.

SANTEC

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Encomm, Inc.
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Please send me more information about:
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ON THE COVER: Jim Luciani, WA2JNN, engrossed in a chess game via amateur radio. See "Chess and Amateur Radio" on page 32.

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Zero Bias

AN EDITORIAL

Amateur radio, like most things, is a process rather than a static entity. Right now we are experiencing the threshold of the next period of change, and the growing pains are upsetting the *status quo*. There will be leaps in technology that will change the way we look at amateur radio and what we can accomplish or aspire to achieve via the amateur radio bands. Industry will furnish the required new equipment, and amateurs will strive and grow towards a new plateau. This part of the process has been a constant; the direction, however, has been the exciting unknown.

By now the election in Newington is history, and the direction the League will take in the future is being planned by a new President and a new General Manager. If they merely echo the sentiments of the Board of Directors and the perceived view of their membership, then they face hard times ahead. Inherent in any establishment is the great desire to maintain the *status quo* and perhaps puff it out a little, but not at the expense of the *status quo*.

In a recent editorial in *73*, Wayne wrote about "Morse and the demised plain language rules." He made some harsh points and, as usual, partially valid comments. The one issue we've all skirted at one time or another is the Morse code requirements for an amateur radio license. I say *skirted*, because it is definitely one of the touchiest subjects to write about or comment on in amateur radio. Amateurs may not be sure who they will vote for in a future election, but as a group we all seem to take a firm position on how we feel about Morse code.

Well, the reality of the situation is that at some future date there will be a "code free" amateur radio license. That date will not be in the far distant future, but more likely within the next year or two. It probably will be some sort of u.h.f./v.h.f. type of license (yes, considerably above 30 MHz), and it will, in all likelihood, satisfy the communicating desire of between one and two million new applicants. Other countries have had considerable success with similar systems. Yes, there is a very real likelihood that many of these one or two million new amateurs will express an interest in "upgrading" to some sort of h.f. license, and it may cause problems in learning to get along.

Problems notwithstanding, there will be change; we will grow, and most importantly we will prosper rather than suffer for this change. We've seen changes in modality, classes of license, and even incentive licensing severely threaten the *status quo* at inception. None of these changes killed amateur radio, for most of the changes were designed to be *in*clusionary—bringing more people in, or adding enjoyment to what was there. Incentive licensing tended to be *ex*clusionary, severely limiting our growth, but even that couldn't kill amateur radio.

Before you take pen in hand to harangue me for what you may perceive will happen to the bands and for the undoubted "destruction" of the amateur radio you have held sacred since day one of your license, let me offer an analogy.

There is sometimes a difficulty in distinguishing between the perception of a situation and the so-called reality of that same situation. The perception contains components of memory and a mixture of idealized fantasy and wishful thinking. It's sort of like trying to fit into your old army uniform that you've saved for twenty or thirty years. There was no clear cut reason other than sentiment to save it, but save it you did, and for some other inexplicable reason you feel like trying it on one day. Well, your mind *can* conjure up "the good old days," the good times, and the many close friends associated with that uniform. Your mind does, however, cloud over the bad times and bad experiences with time. If you are like most of us, you will quickly see that the uniform "shrank" over the years to the point where you might not be able to button it and you even look comic in it. The reality is at odds with the perception.

Well, amateur radio is not that much different in scope from that situation. Depending on what age and decade you (or I) entered amateur radio, at that point, and only at that point, did the "uniform" fit perfectly. Those were, and for the most part are, our "good old days." This could have been at the Class A and Class B levels of input, or the "new" Novice period, or even the post incentive licensing period. For the most part, we were kids and certainly an annoyance to the amateur establishment, those who were older and working from their own perceptions. We were the cut-ups, the irreverent practical jokers who eventually were put in our place and finally matured. We did, however, fit in and thrive only to rebuke the next generation for the very same things we did. In that respect, things are very much the same today and probably will be just as true in the future. The feared "thundering hoards" of CBers who entered amateur radio have assimilated, or for the most part are indistinguishable from the rest of us. Their CB "uniforms," however, have shrunk in the closet.

For those of you who still have pen in hand and are willing to do battle with change, consider the following. How many of you entered amateur radio through the Novice or Technician ranks? Well, both licenses were opposed vigorously by the "I've got mine" philosophy in amateur radio, and had that philosophy prevailed, you probably wouldn't have been around to read this.

I have no idea of the form or structure this new class of amateur will take, or even where in the spectrum they will operate. I do know that they are needed, that it is inevitable, and that it will happen. I believe that greater days are ahead for amateur radio, for technology, and yes (lest we forget), for industry. Just extrapolate from what we have now in the field of experimentation. If we assume that 2% of the amateurs are actively involved on the frontiers of electronic experimentation, then over 8,000 of us are seeking these new frontiers. If the base number were 3 million as a potential pool, then 60,000 people would have some work in progress; even half that number would be exciting.

You can write to me, though, if you still disagree, and I'll understand. You will have to grant one thing, though, and that is that I am not omnipotent, and it's not within my powers to change things back to a more comfortable time, anyone's comfortable time. I do know that the future of amateur radio looks good and that interesting and exciting times are ahead. It's the difference between begrudgingly accepting or fighting change, and growing with change. You can make it work for you, and who knows, you might even enjoy the challenge of tomorrow.

Travels With CQ

This editorial is being written actually before several trips. We will be leaving in a few days for the Orlando Hamfest, to be followed next week by attending the Charlotte Hamfest. By the time I get to write my next editorial I will have made two other trips to Washington, D.C. and perhaps one more to the Midwest. *CQ* is still on the move, so if you're planning to attend any of the major hamfests this year, be sure to stop by the *CQ* booth to say hello.

73, Alan, K2EEK

Say You Saw It In CQ

Straight talk from owners of TEN-TEC OMNI...

Owners of the TEN-TEC OMNI say it all and much better than we here at the factory could...

Had Century 21 and was more than happy with performance—am upgrading soon so I decided to stay with an excellent American made product.

KA4FJE

As present owner of TEN-TEC 544, I have been very happy with it. Now that I need a rig for a 2nd QTH—it, of course, must be a TEN-TEC.

WA2YHF

This is my third TEN-TEC rig. This new one is best yet! Triton IV is now back-up to new Omni C.

AD1P

This is a wonderful rig with all the serious Ham should need. All reports remark of clean keying and good quality SSB.

N4LS

It is a well thought out piece of equipment. I especially like the QSK and the convenient controls.

W8NOT

I was impressed with your reputation for providing good service and satisfying the customer.

W4JSP

In almost 27 years of Hamming, this is the best rig I've ever owned. Thank you all very much!

W7WKH

Super piece of equipment!!

N3RG

The transceiver has been on the air for 5 days, and I am more than satisfied. It is in my estimation a superb product and does exactly what I expected it to do. Signal reports are most flattering.

N2CER

Fantastic Rig, and I use on SSB ONLY.

KB9VB

I decided on TEN-TEC because of the excellent service policy of your company.

WA4RRC

I'm impressed! Will need time to take proper advantage of all of its good features. This should give the "Rice Burners" a real goal to shoot for!

W8UGT

Very fine Radio. I'm proud to be an Omni-C owner.

WD4SFY

The Omni is a beautiful transceiver. Worth every penny!

KJ5G

The Omni C is a joy to operate. My first contact was Romania.

W4REW

Numerous comments over the air pertaining to product and quality of service were very complimentary.

W5VYT

A prominent local amateur told us, **"I have never met a man who bought a TEN-TEC and didn't like it."** *Also we wanted to buy American.*

AJØS NØCEQ

I have many friends on the air (cw) that are well pleased with TEN-TEC equipment. Especially favored among cw operators is the QSK full break in feature.

W5QNT

This XCVR has to be the ultimate "rig." I am waiting for the matching amp (the Hercules) it is on order.

K8IST

I owned a TEN-TEC Triton IV which was a sweet rig. It was natural to upgrade to another TEN-TEC.

KA4GYU

My decision was based mainly on over the air reports of TEN-TEC owners and also reported good factory service if any troubles with rig did occur.

W7GOY

I am extremely pleased with the OMNI-C. I have owned the best (Collins, Drake, etc.) but this product has them all beat for sheer performance and operator convenience. You are to be congratulated for producing such an outstanding piece of equipment—right here in the U.S.A.!

W9SC

I'm very pleased, after 14 years of DX'ing and contest operations and many more different rigs, this one tops them all. Super RX!

KJ2H CX1BBV

I've owned the Triton 1, then the Triton 4, now the Omni-C. Is there any other rig?

W1ZQI

Have had a Triton IV the past four years. I would not own anything but TEN-TEC. Super rigs and fantastic service.

W5TI

Had Omni-C, then tried most other rigs on market—went back to the best—The American made Omni-C.

KC5WC

I have previously owned Triton IV. Now have Omni-D Series B, your prompt and courteous attention to minor problems in the past together with fine equipment induced me to buy this one.

N5CN

Decision was on previous experience. Traded in a 544 on this rig & the only thing I would have traded that one for is another TEN-TEC—Great rig!

WD4NZP

Fantastic rig!! Mark me down as a TEN-TEC fan for life!!

KA5GKO

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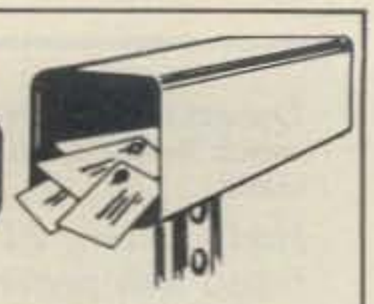

More QRP

Editor, *CQ:*

Since receiving *CQ* magazine I've thoroughly enjoyed the articles, both technical and operating. I particularly enjoy the articles on operating QRP. I operate QRP on HF and 6 meters. I hope that more articles on QRP will be presented in *CQ*.

Fran Dill, Jr., WA3GYW
Kingsville, MD

The Franklin V.F.O.—We Goofed

Editor, *CQ:*

With reference to "The Franklin V.F.O.—With JFETS," *CQ*, January 1982, page 58, there is one minor error in the article as published. In fig. 3, the final operational circuit, the drain resistor on Q3 is shown as 47K ohms, whereas it should have been 4.7K as in the original schematic. Actually, the method of determining the correct size of all the drain resistors is covered in the article, but I suppose someone just looking at the schematic might get the wrong information.

James D. Park, VE7IW
Salmon Arm, BC, Canada
(Thanks, James, for bringing this to our attention.)

An SWL Proponent

Editor, *CQ:*

I recently subscribed to *CQ*. I am not an amateur. However, I am an SWL and also monitor the HF and VHF aviation communications. I use a Hammarlund HQ-200 for the SWL and HF and a Regency AR-136D for the VHF.

My reason for subscribing to *CQ* was due entirely to the articles written by Karl T. Thurber, Jr., "Antennas for the Listener, Parts 1 and 2," and T.E. White, "A Primer of Lightning Protection," which appeared in the June and July 1981 issues of *CQ*. The articles were very informative, well written, and had a good format. I wrote to Messrs. Thurber and White and expressed my appreciation for their articles. I also asked a lot of technical questions, enclosed some sketches, and an s.a.s.e. Both replied immediately, which I appreciate very much—another reason for my subscription to *CQ*.

I also found the article "Shortwave Viewing: An SWV Report" by Bill Cikas in the June 1981 issue very interesting and would like to see more articles about SSTV.

I realize the *CQ* is devoted mainly to amateurs as the title clearly indicates, and that SWL along with monitoring HF and VHF aviation bands doesn't exactly thrill most amateurs. You might find, however, that by expanding your material to include more SWL and receiving/listening articles, your circulation would increase and you may attract more SWL types like myself into the amateur ranks.

Herbert G. Gardiner
Honolulu, HI

It's Play Time!

Editor, *CQ:*

Enclosed is a photo of my "shack." As you will note, the operating table has been constructed from the article "A Novel Operating Table For The Ham Station" by KØDAS in the September 1981 issue of *CQ*. The table is perfect for my "shack" and is as strong as an ox.

I am retired from the Federal Drug Enforcement Administration and have always been interested in amateur radio, but never had the time to pursue it. So, having retired, with plenty of time on my hands now, I got my Novice ticket in October 1981 and am now ready to upgrade—age 55.

I started operating with a Hallicrafters FPM 300 transceiver, but at Christmas I "graduated" to a Kenwood TS-530S. I use a half-wave dipole antenna for 40 meters strung up at about 30 feet, but expect to purchase a good vertical.

John C. Wilkie, Jr., KA4WNX
Columbia, SC

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* Patent pending

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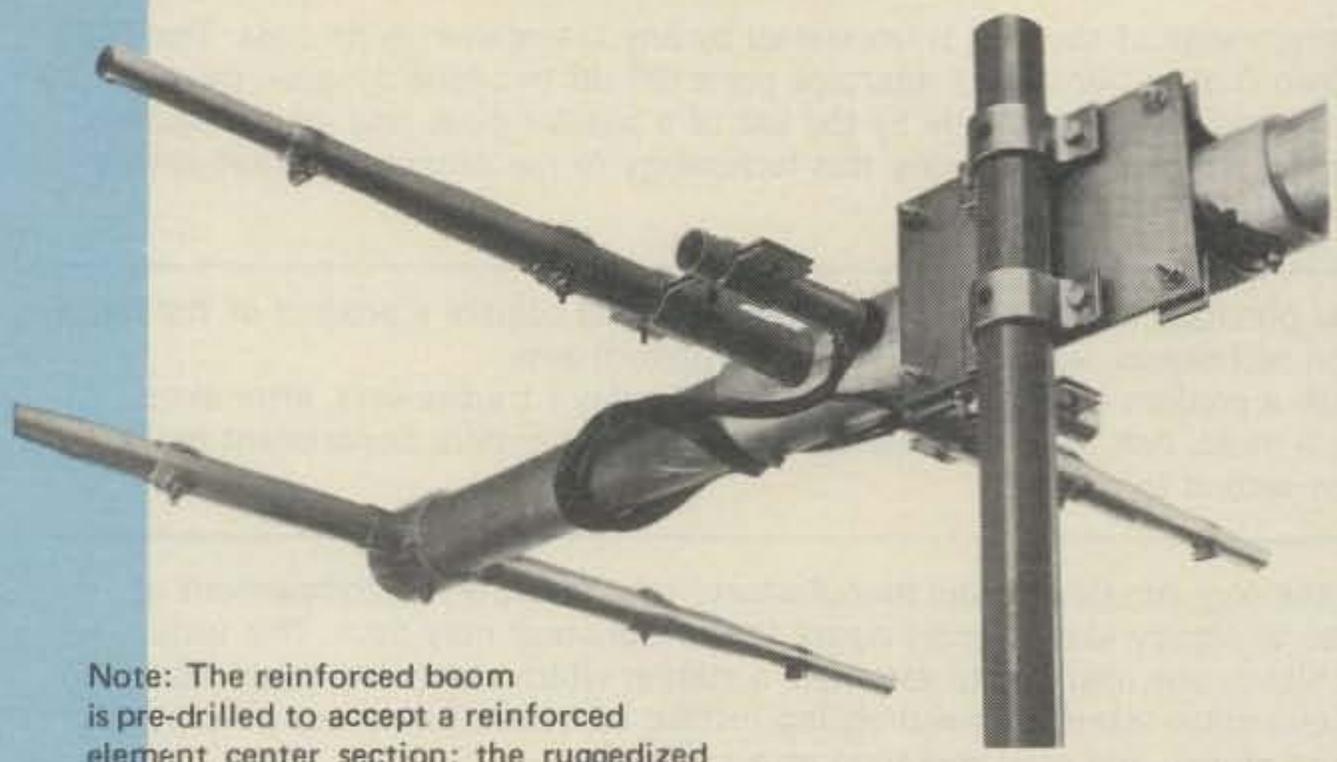

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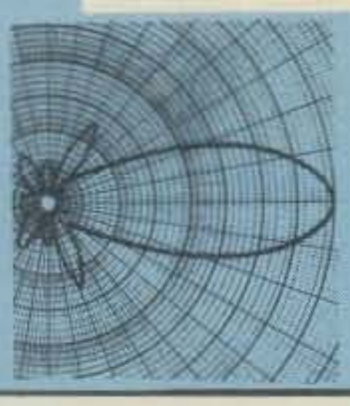

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Announcing

- **Atlanta Radio Club Scholarships** - The Atlanta Radio Club will award three $500 scholarships for the fall of '82. Recipients must be licensed amateurs. For information and forms write to Phil Latta, W4GTS, Secretary, Atlanta Radio Club Scholarship Committee, 259 Weatherstone Pkwy., Marietta, GA 30067. Completed applications and transcripts must be received by July 1, 1982.
- **Killeen, Texas, Centennial Special Event Station** - To mark the centennial of Killeen, Texas, KA5ACT will operate from May 1–15 on 28.730 MHz Saturdays, Sundays, and Mondays plus or minus QRM. Operation will be on 21.410 Tuesdays through Fridays after 6 p.m. CDT. A special QSL will be available for an s.a.s.e. to ARS KA5ACT, T.L. Johnson, 1212 Bonnie Dr., Killeen, TX 76541.
- **IRARC "Sun-Day" Exercise** - The Indian River ARC will participate in a "Sun-Day" exercise with the Florida Solar Energy Center at Cape Canaveral, Florida, on Friday and Saturday May 7–8, using the call W4NLX/4. Operation will be from 1300–1400 GMT on 40 meters, 7.275 kHz s.s.b., and from 1400–2000 GMT on 15 meters, 21,350 to 21,375 kHz s.s.b. A certificate will be sent for a QSL and s.a.s.e. (foreign, 1 IRC) to Florida Solar Energy Center, Att. "Sun-Day," 200 State Route 401, Cape Canaveral, FL 32920.
- **Dogwood Festival QSO Party** - The Greater Fairfield ARA will observe the annual Dogwood Festival in Fairfield, Connecticut, by operating on 6 bands (s.s.b.—3.975, 7.235, 14.330, 21.420, and 28.710; f.m. 146.55 simplex) with the club call WB1CQO, May 8 from 1300–2200 UTC. A special QSL will be available. Send an s.a.s.e. or IRCs to Grace von Stein, KA1JT, 248 Euclid Ave., Fairfield, CT 06432.
- **Netherlands-American Bicentennial** - The Holland ARC will operate K8DAA for the Netherlands-American Bicentennial from May 12–16. Operations will be on all phone bands and possibly some c.w. One contact with K8DAA or two participating stations is required for a certificate. QSL to HARC, P.O. Box 92, Zeeland, MI 49464.
- **Armed Forces Day** - This year's Armed Forces Day will include operation of K8DMZ from 1400–2200Z on Saturday, May 15, from the U.S. Air Force Museum at Wright-Patterson Air Force Base near Dayton, Ohio. Operation will be in the General Class phone segments of 75, 40, 15, and 10 meters, with periodic c.w. into the Novice sub-bands. A special certificate will be issued. For more information, contact Joe Ventolo, USAF Museum, 513-255-3284.
- **Operation From Cape Hatteras Lighthouse** - The weekend of May 15–16 the Rockingham County ARC will operate from the Cape Hatteras Lighthouse on the Outer Banks of North Carolina. Operating frequencies will be 30 kHz up from the bottom of the general portion in each band, both phone and c.w. *(No call given.)*
- **Montrose, Colorado Centennial** - The Montrose ARC will operate from Montrose, CO, during the centennial celebration on May 21–22 from 0000Z to 2400Z daily. Operating frequencies for WØINS on s.s.b. will be 7250, 14300, and 21375 MHz. On c.w., KJØG will operate on 7050, 14050, and 21050 MHz. For a special certificate send QSL and large s.a.s.e. to Lloyd E. Farrow, WØINS, P.O. Box 703, Montrose, CO 81401.
- **Special Events Station CZ3SFR** - The Smith Falls ARC will operate CZ3SFR on all h.f. bands and 2 meter v.h.f. from May 22 through June 7 commemorating the 150th anniversary of the Rideau Canal system linking Ottawa and Kingston. QSL's send business-size s.a.s.e. to P.O. Box 215, Smith Falls, Ontario, Canada K7A 4T1.
- **Memphis in May Special Event Station** - The Memphis, Tenn., Radio Relay Club will operate from 1200–2000 UTC May 22 and 1200–1800 UTC May 23 to celebrate the Memphis in May Festival. Frequencies: c.w.—7,125 and 14,180 kHz ±QRM; s.s.b.—7,280, 14,305, 21,400, 28,650 kHz, and 146.52 MHz ±QRM. For a special certificate send a 9 × 12 s.a.s.e. to N4ERU or N4CWS, 2071 Victoria, Memphis, TN 38116.
- **Mount St. Helens QSO Party** - The Clark County ARC, W7AIA, will hold this second annual QSO Party on May 22–23 from 0001 UTC May 22 through 2359 UTC May 23. Operation will be on 3.895, 7.230, 14.280, 21.360, and 28.505 s.s.b.; 3.705, 7.105, 21.105, 28.105 c.w.; and on various Vancouver and Portland repeaters. For the special certificate, send log info or QSL card and $2.00 (or 8 IRC's) to Award Manager, W7AIA, P.O. Box 1424, Vancouver, WA 98668.
- **WB8TQG From Neffs, Ohio** - Neffs Area Amateurs (Belmont County) will operate WB8TQG, the smallest ham radio shack in Neffs, Ohio, and perhaps in the world. Operation will be from 1600Z May 29 to 2200Z May 30 on 146.46, 28.610, 21.410, 14.340, 7.265, and 3.965 phone; and 28.120, 21.120, 7.120, and 3.720 c.w. A certificate will be sent for a

(continued on p. 117)

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7.2-3	40M 3 el. beam	$529.95	**$449.00**
7.0-7.3-4A	40M 4 el. beam	$749.95	**$629.00**

Product No.	Description	Regular	Special
144-148-13LB	2M, 13 el. long boom	$ 89.95	**$ 77.95**
432-16LB	432MHz, 16 el. long boom	$ 74.95	**$ 60.70**
144-150-16C	2M, 16 el. Cir. pol.	$116.95	**$ 93.55**
420-450-18C	435 MHz, 18 el. Cir. pol.	$ 69.95	**$ 58.70**
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RESULTS OF THE 1981 CQ WORLD WIDE WPX CW CONTEST

BY BERNIE WELCH*, W8IMZ

Did you contact JTØWA on all bands? The operator, Jiri, OK1DWA, provided an extra triple thrill using the unique prefix and being a rare DX country and WAZ zone.

Conditions in general were somewhat improved over the 1980 Contest, although in the continental United States the 10 meter band faltered and was only marginal. It was another weekend of WPX and DX fun with participation at an all-time high. This provided us with thirty percent more logs than last year.

The Yugoslavians were top scorers in four categories: YT2D, All Band; YU4GD, 14 MHz; YU3EF, 1.8 MHz; YTØR, Multi-Multi. The YTØR crew also established the new WPX record of 632 prefixes. Congratulations also to the YU DX Club. Their achievement is another record, and for the first time the World Club Competition Trophy has been won by a European group. The Frankford Radio Club is the winner of the new USA Club Competition Trophy. Very FB.

The AI6V multi-multi group was not content to hold only the USA S.S.B. record. As true champions, they now also hold the USA C.W. record. Congratulations. The KH6XX crew almost accomplished the same thing world wide; however, it did not happen. They came in second to YTØR by only 120,988 points. Have you noticed the increase in the QRPp activity? QRPer 4X6NDE did what many thought was impossible. His 21 MHz score of 655,500 was over 210,000 higher than that of OA8V, the All-Band trophy winner. A special CQ trophy will be awarded for 21 MHz QRPp this year. N3RS increased his score and continues his firm hold on the U.S.A. QRPp record.

More than three contest expeditions participated, which allowed us to present a trophy this year. Marty, OH2BH, and his Aland Island OHØBH group are the winners, which makes them the initial recipients of the award.

*7735 Redbank Lane, Dayton, OH 45424

4Z4DX was #1 on 7 MHz in '80 and is the top 3.5 MHz station this year.

Per your many requests, we have included in these results the WPX C.W. Contest All-Time World Record Holders. Next year we hope to expand this to include all continents.

Several queries have been received regarding the legality of stations operating with certain portable prefixes in the WPX Contests. Our rules clearly state: "A station in a call area different than that indicated by its call sign is required to sign portable. The portable prefix would be the multiplier." Example: W8IMZ/4 would count only as W4, N8BJQ/5 would count as N5, while W1WY/KV4 would use KV4 as the multiplier. Reciprocal licensed stations, such as G4AAQ/KR8, are required by the FCC to sign portable using any legal prefix authorized in the USA District in which they are operating. For WPX Contest purposes only the portable prefix is the multiplier.

As announced in Frank, W1WY's Contest Calendar in the March *CQ*, a new trophy, donated by Lance Johnson Engineering of Kansas City, Missouri is available for the World High Scoring C.W. Single Operator, 3.5 MHz category, effective with the upcoming '82 event.

Now is the time to prepare for the 1982 WPX C.W. weekend, 29–30 May (GMT). Official sample log and summary forms are available from the *CQ* office. U.S.A. send s.a.s.e.; others send IRC's and self-addressed business-size envelope.

These results were compiled primarily through the efforts of Steve Bolia, N8BJQ, and myself, with the clerical assistance of my XYL, Eleanor. Thanks to Steve and his TRS-80, a number of the logs have been computer checked—a first for the WPX log checkers.

The complete current rules are published in the February '82 *CQ* magazine. Please send your 1982 WPX Contest logs (large or small) direct to me or to the *CQ* office. Your participation is appreciated. Good, clear photographs are always welcome. Hope to work ya in the next one. CU in the pile-ups. Good luck.

73, Bernie, W8IMZ

Random Contest Comments

Lots of fun and confidence until I heard 4X6NDE/QRP near mid contest . . . *N3RS*. This contest is a QRPer's dream . . . *N2AA*. JTØ if he is for real—now have 98 countries QRP . . . *AJ7S*. Very pleased to work JTØWA with 5 watts on the 2nd call . . . *WØKEA*. Thrill hearing SVØAU on 15 mtrs then working him! (QRPp) . . . *WA6POC*. Tremendous fun . . . *KN5D*. ZS4SP came back to my CQ (QRP—2 watts) . . . *KH6CP*. Not a lot of contesters in the VK Novice band segments . . . *VK2VVA*.

Could not QSO ZD8, HZ1, 9X5, 9J2, etc. QRP was so difficult for pile-up . . . *JA1EF*. Quadrupled my score of last year's contest . . . *OH5WH*. Really a thrill to work all continents plus 40 countries with one watt output . . . *PA3ABA*. Pleased to work EA9JG, then ZB2EO for new countries, QRP . . . *AA8S*. Incredible 15 mtr propagation to Europe—best WPX conditions ever . . . *KN5H (Op: K5GN)*. Last contest for this antenna system—quads, slopers, and inverted Vees next . . . *KØRWL*.

Stock in the local brewery always goes up at contest time. Wonder why? . . .

We Goofed In The '81 WPX S.S.B. Results:

The data pertaining to the outstanding efforts of VK4VU were inadvertantly deleted. He scored 2,832,384 points, had 2,003 contacts, and 411 prefix multipliers. He is the high-score all-band station for Australia. Please excuse the error, Martin.

KB8SX. Propagation was typical for May—not too great . . . *AA4M*. New 40 mtr antenna boosted our score dramatically. Lots of prefixes around . . . *VE1DXA (Op: VE1AVX)*. Condx great—would like rules to allow M/S to use spotter as in CQ WW DX . . . *VE3PCA (Op: VE3KKB)*. We had lots of fun . . . *VE7ZZZ (Op: VE7ENF)*. This log 4K1A was received through the air. 73's . . . *UB5MNM*. The operators sometimes made a mistake sending same number to different stations . . . *8J5SUN (Op: JA5ABY)*. Not good conditions between JA and W on 10 meters . . . *JA4YFH (Op: JF3GPS)*.

Unfortunately we could not make any contacts on 160 meters . . . *JA0YAK (Op: A. Asai)*. The best contest in the world, thank you . . . *JA3YQD*. Sorry we did not reach the 600 level for multiplier, but we did our best . . . *YO0A*. XZ5A called us on 15, if it was not slim, that's a thrill . . . *AI6V*. 105 contacts (51%) got us no points. I think maybe something should be changed to eliminate this problem area . . . *NN3SI (Op: K3KMO)*. Where were the W's?? . . . *JT0WA (Op: OK1DWA)*. My best c.w. score in any contest . . . *EA8TY*.

Great fun and most enjoyable . . . *ZS4SP*. A very good contest with best rules for the most stations . . . *KL7RA*. The call N6YK/VP2A on c.w. takes forever—a real handicap . . . *N6YK*. Rain static, thunderstorms, and power failures made the selection of off time easy . . . *VE6OU*. Postal strike is a bit of inconvenience . . . *VE3GCE*. All on straight key—still recovering . . . *VE4AIV*. Still lots of room for more stations . . . *VE3BMV*. No dupes as only worked new prefixes . . . *VO2CW*.

Surprised at the good summer conditions on 80 meters . . . *VE3IY*. I think 8 rest periods

A 1.3-million-plus score by 15-year-old Bill, KM5R, was very FB.

From his Guam QTH, Joel, KG6DX, was 28 MHz world high.

more appropriate . . . *HH2VP*. 10 meters very poor; next time will take a better band . . . *KP4EQF*. Where are the All-Time Records for c.w.? . . . *4Z4KX*. I am 73 years old (or young), first licensed in 1925, the old call was A3GN . . . *VK3CM*. A fun contest, longer participation next year . . . *KH6JWK*. Fantastic contest, I would not have believed that I could work so many stations on 10 meters with my setup . . . *ZL2RY*.

In the Extra portion of the bands my call was WA1YEC/BS. Worked CE0AE for #271 . . . *W1CNU*. Even in May, QSO's with many European stations are still possible . . . *WB2SJG*. Too many interruptions! . . . *N3BPY*. See you next year with my new Extra call (if I pass), hi . . . *KA3FMH*. I'm at school 9 months of the year. Nice to have a test this time of the year. Super Contest! Loads of DX . . . *WB3HVS/4*. 21 MHz was exciting around the clock . . . *W4BV*. Working a JT0 at end of contest really made my day . . . *W4KMS*. As long as the FCC is in business, the multipliers will keep rising! (161 USA Prefixes) . . . *K5RC (Op: K5ZD)*.

What a pleasure to work the world's best operators . . . *N5DEE*. Kinda tuff operating with a hung up relay . . . *WB5DDI*. Still might make the WPX Honor Roll—hi!—(857/637). Great fun . . . *W6LC*. One of the best contests! . . . *AA6EE*. Just getting over the flu-bug. If it wasn't for my Morse Matic I would have given up in a few hours or less . . . *N6UW*. My code started slow and got slower or everyone else got faster . . . *KG5W/7*. Arizona is a good location for this contest on 21 MHz—clear shot EU, JA, and crazy eastern USA prefixes . . . *K6LL7*.

More fun if in April! . . . *K7UR*. Surprised to work JT0WA on 15 and 4X4VL on 40. Keyer died 2nd day . . . *KC8C*. Glad I didn't get more

C.W. & S.S.B. CLUB COMPETITION

YU DX Club (Yugoslavia)	**41,003,768**	Hamfesters Radio Club, Inc.	1,789,683
Frankford Radio Club	**30,272,829**	Danish DX Group (Denmark)	1,783,333
Pac Rats (Hawaii)	26,769,933	Signal Radio Club (USSR)	1,628,699
North Texas Contest Club	24,546,253	Eastern Iowa DX Assn	1,561,449
Northern California Contest Club	22,979,880	Rubber Circle Contest Club	1,457,921
Fraser Valley DX Club	21,928,606	Central Arizona DX Assn	1,331,564
The Bullmertz (Sweden)	21,687,685	Wireless Institute of Northeast	1,303,277
Lithuanian Contest Group	16,046,635	Eastern Michigan Amateur Radio Club	1,270,454
Ontario Contest Club (Canada)	15,412,898	Colorado Contest Conspiracy	1,260,441
Yankee Clipper Contest Club	15,044,047	SP DX Club (Poland)	1,258,830
Kansas City DX Club	14,108,299	Dayton Amateur Radio Assn	1,215,309
Potomac Valley Radio Club	12,762,969	Magilla's Gorillas Contest Club	1,175,650
Kaunas Polytech Institute (Lithuania)	11,907,833	Albuquerque DX Assn	1,167,156
Ponce DX Club (Puerto Rico)	11,579,045	South Jersey Contest Coalition	1,122,360
Texas DX Society	10,594,829	Central Illinois DX Contest Club	1,095,252
Halifax A.R.C. (Canada)	9,141,846	Northern California DX Club	795,676
Cambridge University Contest Club (England)	8,289,099	Bavarian DX Group (F.R.G.)	773,916
San Diego DX Club	8,179,941	Ft. Wayne Radio Club	722,160
Murphy's Marauders	7,378,811	Lower Columbia Amateur Radio Assn	601,392
Northern Ohio Amateur Radio Society	7,030,673	Southeastern DX Club	584,722
Willamette Valley DX Club	6,918,766	Ill Wind Contesters	429,848
Northern Illinois DX Assn	4,435,988	McDonnell Douglas Amateur Radio Club (St. Louis)	407,925
Northern Ohio DX Assn	3,794,474	Southern California DX Club	357,876
Michigan DX Assn	3,088,196	North Florida Amateur Radio Society	314,888
North Florida DX Assn	2,738,128	North Alabama DX Club	265,232
South German DX Group	2,471,350	Radio Club of Tallinn (Estonia)	176,147
C.W. Club of Mines Gerais (Brazil)	2,352,584	Glouchester County Amateur Radio Club	116,845
Redwood Empire DX Assn	2,278,584	San Angelo Amateur Radio Club	112,514
Trondheim DX Club (Norway)	2,063,274	South Jersey Radio Assn	102,410
Mad River Radio Club	1,949,687	Dade Radio Club	89,229
Alaska DX Assn	1,883,914	South Bay Amateur Radio Club	48,396
Western Washington DX Club	1,790,087	Ventura County Amateur Radio Club	14,774

Say You Saw It In CQ

time to operate (18 hrs.), otherwise I'd be a basket case . . . *K8PUJ*. Spent more time programming computer than on contest . . . *K8HF*. Quite a change from the Novice Roundup up to this one. A lot of explaining for the /DT. hi! . . . *KA8IYM*. Strange propagation—working Orient and Pacific along with Europeans at the same time with beam into Europe—point it west and nothing . . . *WA9EKA*. Bernie—Good to see you at Dayton . . . *AB7L/9*.

On last rest period I was able to help put up W9KNX's new antenna . . . *K9QVB*. How could I miss so many "easy" prefixes (N1, N0, KA6, KA7, etc.) . . . *KB9OF*. A little late in the season for 10 meters, but super for 15 and 20! . . . *W0WP*. JT0WA on 15 meters for a new c.w. zone . . . *WA0TKJ*. Exchanged #109 with JE1REU and #206 with DJ0UJ . . . *KF0Z*. Biggest letdown was finding out G4AAQ/KR8 was only in W8 land . . . *N0BGI*. Very bad condx to JA. Big USA signals. Beautiful contest . . . *YU3DDX*.

All stations from Varazdin celebrating the town's 800 years are using special prefix YZ9 all 1981 . . . *YZ9VC*. Tried to work North American on 7 mc. The s.w.r. indicated total collapse, and with justice, the antenna had fallen down and was lying on the ground . . . *SM6HCJ*. Licensed on March 10, '81, this is my first test with my own call . . . *I2UIY*. Condx poor, but nice again to do *CQ* WPX . . . *PA0DIN*. In SAC contest last September hoping to work an OY station which I found in the WPX Contest. Also I worked my first C6. Thank you . . . *SV1NN*. Old timer and a subscriber of *CQ* magazine . . . *F8VJ*. All QSO's are with different PX . . . *DL1AM*. 10 Meters is over from here . . . *OH3YI*. My age 17. Licensed since May 1980 . . . *OH1ZE*.

Number groups after call letters denote Band, Score, QSO's and Prefixes. Bold listings are certificate winners.

QRPp —SECTION— WORLDWIDE

OA8V	**A**	**444,768**	**609**	**246**
		(Opr: OA8LP)		
N3RS	**A**	**419,100**	**520**	**300**
N2AA	**A**	**361,264**	**489**	**268**
N4KG	**A**	**327,574**	**490**	**293**
JA1MCU	**A**	**319,545**	**476**	**243**
AJ7S	**A**	**228,245**	**442**	**239**
K7SS	"	206,190	404	237
W0KEA	**A**	**134,524**	**311**	**199**
OK2BMA	**A**	**133,856**	**386**	**188**
WA6POC	**A**	**118,440**	**308**	**188**
KN5D	**A**	**111,360**	**253**	**174**
OK2PDL	"	94,605	215	159
UC2AAX	**A**	**72,372**	**254**	**148**
JA1KFX	"	70,216	217	134
KH6CP	**A**	**47,793**	**184**	**89**
UC2AHA	"	47,580	170	122
JE1MGE	"	43,279	151	113
G3VMY	**A**	**37,130**	**221**	**94**
G4LMJ	"	33,900	179	113
SM0FSM	**A**	**29,680**	**144**	**106**
KA1EEF	**A**	**27,528**	**118**	**93**
JA1NLX	"	27,060	125	82
UC2AFI	"	25,334	145	106
UC2WBT	"	17,956	268	67
KA1CZF	"	17,688	113	88
JA4JKD	"	13,293	74	63
G4EBO	"	7,260	62	55
EA8EY	**A**	**4,080**	**40**	**34**
PA0PLM	**A**	**3,116**	**41**	**38**
N8CQA	**A**	**2,880**	**34**	**32**
VK2VVA	**A**	**2,016**	**33**	**21**
UA6WBZ	"	630	16	15
JA1EF	**28**	**46,368**	**174**	**126**
UA9SHO	**28**	**7,191**	**66**	**51**
DJ6TK	**28**	**4,720**	**55**	**40**
UR2TBG	"	900	20	20
JA7HMZ	"	800	21	20
OZ8E	"	429	13	13
4X6NDE	**21**	**655,500**	**816**	**285**
OH5WH	**21**	**241,066**	**436**	**257**
UR2CR	**21**	**176,147**	**370**	**227**
KP4O	**21**	**141,075**	**267**	**209**
YU4VSZ	**21**	**138,768**	**315**	**177**
I0SKK	**21**	**120,330**	**319**	**191**
UA9FGJ	**21**	**76,300**	**197**	**140**
SM6A0Q	**21**	**75,600**	**218**	**150**
PY1BVY	**21**	**62,608**	**191**	**112**
PA3ABA	**21**	**45,510**	**183**	**123**
WB1HJF	**21**	**44,104**	**170**	**148**
Y22PM	**21**	**30,888**	**145**	**99**
PY1WDS	"	8,100	60	50
OH7EU	"	544	20	16
JA9JKL	"	363	12	11
YO5TA	"	264	12	12
OZ6SF	"	91	7	7
UB5EDM	**14**	**127,624**	**742**	**172**
AA8S	**14**	**77,810**	**215**	**155**
I1ZVF	**14**	**53,010**	**199**	**114**
SM5AFE	**14**	**39,603**	**208**	**129**
UA3AMB	**14**	**35,160**	**214**	**120**
YO6HQ	**14**	**23,751**	**167**	**117**
KB7NV	**14**	**22,213**	**128**	**97**
Y23TL	**14**	**17,064**	**104**	**79**
JA2JSF	**14**	**7,084**	**60**	**44**
OZ9MM	**14**	**4,264**	**63**	**52**
G3DOP	**14**	**1,102**	**34**	**29**
HA8CZ	"	638	29	22
SM6DVZ	"	598	26	23
OK1DCP	**7**	**48,750**	**178**	**125**
Y26EI/p	**7**	**34,020**	**169**	**105**
YO3AWD	**7**	**10,962**	**77**	**63**
UA3XCQ	**7**	**4,368**	**51**	**39**
SM7CZC	**7**	**1,344**	**31**	**24**
JJ1INO	"	748	18	17
UA3XBY	"	336	14	14
UA0LCQ	**3.5**	**2,369**	**32**	**23**
Y22DK	**3.5**	**2,108**	**37**	**31**
Y21MF	"	1,914	37	29
UA9CJA	**1.8**	**1,118**	**15**	**13**
EZ4UAA	**1.8**	**1,118**	**28**	**22**
OL1BBR	"	560	29	20
UR2MS	"	448	15	14
UR2HB	"	84	8	7

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KC1F	**A**	**2,150,261**	**1611**	**499**
KA1R	"	222,105	425	221
WA1YEC	"	168,113	322	187
W1CNU	"	79,659	501	159
W1OPJ	"	6,860	51	49
W1BET	"	1,679	28	23
WA1FCN	**28**	**17,745**	**129**	**91**
K1XA	**21**	**832,663**	**942**	**379**
KA1CLV	"	23,616	101	82
KA1CFC	"	8,967	69	61
W1WY	14	4,640	40	40
KA1GQ	"	2,250	31	25
AK1A	**7**	**64,735**	**211**	**136**
N2LT	**A**	**1,787,496**	**1412**	**426**
WB2SJG	**A**	**1,022,592**	**1010**	**384**
W2FTY	"	273,942	440	267
W2VJN	"	214,500	344	165
		(Opr: WA2ZKY)		
KA2CLQ	"	159,328	408	208
WB2QEU	"	76,440	204	156
W2FUI	"	60,436	179	116
WB2GES	"	56,461	185	131
K2TD	"	54,432	174	124
K2HPV	"	53,259	168	123
N2UN	"	49,257	161	117
KA2CGV	"	31,719	129	97
N2CQ	"	1,875	27	25
KC2X	**21**	**206,423**	**467**	**259**
K2SX	"	116,319	573	203
N2MM	**14**	**859,320**	**917**	**372**
WA2IFS	"	12,871	72	61
N2GC	**7**	**50,176**	**159**	**128**
K3LR	**A**	**1,773,121**	**1486**	**439**
W3ARK	**A**	**406,527**	**542**	**291**
K3VW	"	150,718	323	179
W3ICM	"	104,894	257	179
W3HDH	"	79,593	194	129
AA3B	"	76,319	243	167
K3OO	"	44,880	132	110
N3KR	"	34,441	134	101
K3ZUF	"	23,919	78	67
WA3VPL	"	8,855	60	55
N3BPY	"	7,968	60	48
W3FQE	"	7,524	57	44
AI3E	"	4,956	47	42
K3FN	**21**	**295,036**	**434**	**257**
KA3FMH	"	45,090	215	135
WA3DMH	"	12,600	75	56
WA3JXW	"	44	4	4
K3HPG	**14**	**599,315**	**710**	**335**
K3ND	"	23,936	101	88
KC3N	**7**	**126,636**	**335**	**183**
W3BGN	"	124,122	197	137
K4PQL	**A**	**1,422,006**	**1410**	**347**
WN4KKN	**A**	**1,171,118**	**1277**	**403**
WB3HVS/4	"	287,844	483	289
WB5YMS/4	"	192,028	345	244
N4KE	"	169,694	293	238
WA4DRU	"	153,468	328	196
W4BV	"	144,024	308	204
N4YB	"	128,775	258	255
W4YN	"	89,229	220	147
WD4PZN	"	77,120	241	160
W4KMS	"	61,632	190	144
AJ2E/4	"	57,855	182	133
W4FDA	"	46,617	143	123
N4EHA	"	29,036	172	119
N4DEK	"	26,255	109	89
K4OD	"	24,480	110	80
N4ZC	**28**	**136,086**	**336**	**222**

CQ WORLD WIDE WPX C.W. CONTEST ALL-TIME RECORDS

(Data following the calls are: Year of operation, score, and number of prefix multipliers.)

WORLD RECORD HOLDERS

Single Operator

1.8	YU3EF('81)	24,360	84
3.5	4Z4DX('81)	379,652	182
7	OA4AWD('81)	1,137,504	272
14	4N1U('80)	1,540,640	401
21	HD0E('80)	3,544,416	496
28	LU8DQ('80)	1,627,660	388
AB	KP2A('80)	3,463,593	483
QRPp	OA8V('81)	444,768	246

MULTI-OP SINGLE XMTR

UZ9A('80) 5,000,135 511

MULTI-OP MULTI-XMTR

YT0R('81) 7,545,448 632

CLUB RECORD

YU DX Club('81) 41,003,768

WPX (Prefix) RECORD

YT0R('81) 632

BARKER & WILLIAMSON

VERTICAL ANTENNAS

MODEL 370-31 Slim Line Vertical designed for 10, 15, 20 and 40 meters. All traps pretuned. Overall height 21 feet. Can be used with or without ground radials. Model 370-33 — 75 meter add on kit. 75 and 80 meter operation optional with model 370-33 add on kit. Power rating 1 KW-2 KW P.E.P.

MODEL 370-30 Economy model vertical for 10, 15, 20 and 40 meter operation. High Q factory tuned traps. Overall height 21 feet. Can be used with or without ground radials. Model 370-32 — 75 meter add on kit. 75 and 80 meter operation optional with model 370-32 add on kit. Power rating 1 KW-2 KW P.E.P.

MODEL 370-34 Radial Kit. Radial Kit for Models 370-30 and 370-31 Vertical antennas. All necessary wire and hardware for two ground plane radials. Write for more details and other antenna products.

B&W

Barker & Williamson, Inc.
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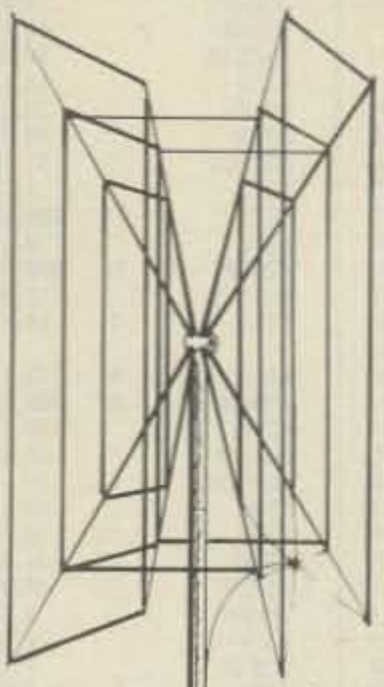
215-788-5581

CIRCLE 79 ON READER SERVICE CARD

Tough New Tri-Band QUAD for 10, 15 and 20 meters



QDX-3Z | **$169**

- Complete - nothing else to buy!
- Lexan boom for high strength
- No stubs or tuning coils
- UV Imperious fiberglass arms
- Optimum spacing on all bands
- Full legal power on SSB and CW
- Outperforms most tri-band yagis
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- Low SWR on all bands

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New compact 24-piece kit of electronic tools for engineers, scientists, technicians, students, executives. Includes 7 sizes screwdrivers, adjustable wrench, 2 pair pliers, wire stripper, knife, alignment tool, stainless rule, hex-key set, scissors, 2 flexible files, burnisher, miniature soldering iron, solder aid, coil of solder and desoldering braid. Highest quality padded zipper case, 6 x 9 x 1¾" inside. Satisfaction guaranteed. Send check, company purchase order or charge Visa or Mastercharge. We pay the shipping charges.

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JENSEN TOOLS INC.
1230 S. PRIEST DR. TEMPE, AZ. 85281

CIRCLE 88 ON READER SERVICE CARD

NE4L	**21**	**265,232**	**553**	**274**
WA4OML	"	111,408	256	176
WB4TDH	**14**	**724,625**	**858**	**341**
AA4NC	**14**	**378,606**	**590**	**267**
AA4MI	"	51,491	213	151
KC4ZT	"	6,300	60	60
W4YDL	"	3,392	37	32
WA4SVO	**7**	**55,594**	**170**	**133**
K5RC	**A**	**1,918,214**	**1491**	**478**
		(Opr: K5ZD)		
K5MR	**A**	**1,523,963**	**1494**	**427**
KM5R	**A**	**1,395,578**	**1403**	**431**
K5NW	"	911,200	1019	400
WA5SOG	"	402,876	555	279
W9PL/5	"	362,806	592	283
N5DEE	"	136,610	317	190
W5OB	"	62,100	178	138
N5CDC	"	44,515	194	145
W5ASP	"	34,299	121	103
WB5DDI	"	24,734	109	83
W3PC/5	"	8,440	60	40
KM5K	**28**	**59,640**	**336**	**168**
K5FUV	"	18,445	120	85
WA5DXI	**21**	**501,164**	**764**	**349**
N5AF	"	92,747	266	163
W5WMU	**14**	**840,408**	**901**	**388**
KO5C	**7**	**57,036**	**255**	**147**
KB5FU	"	19,608	191	114
K5UR	**3.5**	**7,968**	**109**	**83**
N6CW	**A**	**1,835,664**	**1455**	**458**
N6AN	**A**	**262,397**	**543**	**257**
AC6H	"	128,439	340	201
W6LC	"	118,755	298	195
WA6TKT	"	66,360	206	140
AA6EE	"	64,883	252	161
W6BYH	"	56,994	142	138
AA6DP	"	50,120	197	140
WA6UFY	"	45,012	182	124
N6UW	"	35,404	152	106
K6NA	"	33,920	139	106
N6HK	"	32,076	131	99
W2KVA/6	**28**	**16,482**	**114**	**82**
N6VR	"	14,774	103	83
W6YMH	"	6,327	67	57
N6RO	**21**	**1,184,612**	**1225**	**418**
WA6DBC	"	791,112	971	357
KA6IYE	"	58,090	190	157
KT6V	**14**	**496,059**	**761**	**327**
KN6M	**7**	**441,610**	**597**	**215**
N6ND	**7**	**400,768**	**543**	**202**
N6PE	**3.5**	**4,300**	**54**	**50**
W7JYW	**A**	**460,512**	**642**	**288**
KG5W/7	**A**	**368,082**	**607**	**242**
N7RO	"	145,299	320	187
KI7I	"	73,678	334	187
W7KRM	"	33,300	132	100
KD7H	"	32,736	215	124
K7TTZ	"	15,633	107	81
K6LL/7	**21**	**1,433,457**	**1359**	**459**
AG7M	**21**	**581,085**	**901**	**333**
W7AYY	"	38,115	143	121
AA7A	**14**	**416,176**	**694**	**304**
KB7KE	"	36,100	159	100
K7RI	**7**	**535,464**	**639**	**222**
		(Opr: W7WA)		
K7UR	**7**	**388,516**	**481**	**206**
K7WA	"	7,568	54	43
W7DRA	3.5	128	8	8
K8GL	**A**	**990,990**	**918**	**390**
KD8V	**A**	**349,986**	**578**	**273**
N8TN	"	341,088	548	264
KC8C	"	309,420	460	270
KA8JZR	"	114,351	280	141
K8PUJ	"	104,308	232	178
K8CV	"	69,904	208	136
W8UPH	"	65,142	202	126
K8HF	"	38,796	158	122
W8LAR	"	23,240	101	83
WD8KKF	"	15,996	100	86
KA8IGM	"	13,266	82	67
KA8IYM	"	13,203	82	81
KJ8I	"	11,439	148	93
KA8MHL	"	297	28	27
W8IMZ	28	2,030	42	29
WB8JBM	**21**	**444,020**	**625**	**298**
		(Opr: WD8IJP)		
N8BUF	"	29,680	144	112
K8US	**14**	**77,958**	**234**	**142**
WB8DQP	**7**	**203,280**	**306**	**210**
WD8ALG	**7**	**37,728**	**224**	**131**
WD8JYM	"	11,664	82	72
W8UVZ	"	4,824	44	36
AI9J	**A**	**1,170,967**	**1161**	**409**
AK9Z	**A**	**153,036**	**334**	**218**
WB9HRO	"	49,530	204	130
K9GDF	"	8,500	104	68
WD9GGY	"	6,705	54	45
KB9C	"	1,368	46	36
KB9HG	**28**	**16,200**	**140**	**100**
W9OA	**21**	**376,831**	**540**	**287**
WA9EKA	**21**	**218,596**	**423**	**259**
AB7L/9	"	193,024	400	232
		(Opr: W9RE)		
WB9TBU	"	19,716	103	93
K9QVB	**14**	**613,760**	**787**	**320**
K9YAX	"	64,771	201	133
KB9OF	**7**	**38,916**	**228**	**141**
W9CG	**1.8**	**112**	**14**	**14**
WØWP	**A**	**1,010,840**	**1125**	**370**
WAØTKJ	**A**	**656,696**	**883**	**344**
KØVBU	"	459,780	666	291
KØIHG	"	246,170	445	239
ABØL	"	172,040	434	220
WØEJ	"	104,610	276	165
AKØM	"	35,640	132	99
KEØY	"	33,170	143	107
AKØG	"	10,318	101	77
KØTLM	"	688	16	16
KCØQ	**28**	**4,182**	**47**	**41**
K4VX/Ø	**21**	**912,000**	**1008**	**384**
		(Opr: KBØRC)		
KFØZ	**21**	**62,805**	**229**	**159**
NØBGI	"	26,508	117	94
WBØISW	7	18,000	105	90
		ALASKA		
KL7RA	**A**	**1,864,584**	**1703**	**423**
KL7AF	**7**	**153,000**	**255**	**125**
		ANTIGUA		
N6YK/VP2A	**A**	**1,893,504**	**1500**	**384**
		CANADA		
VE6OU	**A**	**1,649,430**	**1412**	**410**
VE1UG	**A**	**964,022**	**691**	**437**
VE7DP	**A**	**572,367**	**644**	**303**
VE3JCV	**A**	**365,300**	**469**	**260**
VO1AW	**A**	**332,227**	**460**	**217**
VE7ZB	"	261,144	407	234
VE3GCE	"	205,128	334	198
VE7IQ	"	161,704	340	164
VE4AIV	**A**	**148,780**	**361**	**172**
VE2WA	**A**	**143,140**	**271**	**170**
VE1ANU	"	125,481	236	151
VE3FEA	"	23,822	104	86
VE1ZZ	"	13,040	62	40
VE2AEJ/3	**28**	**15,762**	**89**	**71**
VE3BMV	**21**	**1,534,669**	**1263**	**461**
VE3MUV	"	59,469	152	129
VE8EC	**21**	**48,951**	**205**	**111**
VE3GWM	"	43,240	150	115
VE3JAQ	**14**	**711,568**	**908**	**311**
VO2CW	**14**	**100,800**	**200**	**200**
VE6MP	**14**	**55,297**	**180**	**121**
VO1QU	**14**	**12,350**	**92**	**65**
VE3KZ	**7**	**649,288**	**516**	**277**
VE3IY	**3.5**	**91,304**	**213**	**113**
VE1AIH	**3.5**	**86,640**	**163**	**114**
VE3INQ	**1.8**	**440**	**11**	**10**
		CAYMAN IS.		
ZF2AH	**A**	**901,024**	**1299**	**296**
		(Opr: WA6VNR)		
		DOMINICAN REP.		
HI8LC	**7**	**58,680**	**150**	**90**
		HAITI		
HH2VP	**A**	**1,384,936**	**1332**	**392**
		PUERTO RICO		
KP4EQF	**28**	**577,500**	**785**	**300**
KP4CC	**21**	**1,717,632**	**1644**	**426**
		VIRGIN IS. (U.S.)		
KV4AA	**A**	**267,750**	**500**	**210**
KP2A	**14**	**1,141,005**	**1488**	**305**
		(Opr: K8CW)		

AFRICA

		ASCENSION IS.		
ZD8TC	**A**	**1,413,270**	**1155**	**369**
		CANARY IS.		
EA8TY	**A**	**1,029,483**	**982**	**351**
EA8QE	**14**	**484,380**	**692**	**234**
EA8RL	**3.5**	**108,648**	**167**	**108**
		CEUTA		
EA9JG	**14**	**265,321**	**437**	**203**
EA9GT	**7**	**579,824**	**446**	**217**
		LIBERIA		
EL2AV	**A**	**925,080**	**975**	**312**
		SOUTH AFRICA		
ZS4SP	**A**	**95,550**	**215**	**147**
ZS6BUX	**28**	**8,850**	**60**	**50**

ASIA

		CYPRUS		
5B4JP	**21**	**430,274**	**608**	**247**
		ISRAEL		
4Z4KX	**A**	**737,933**	**782**	**271**
4Z4TA	"	95,418	202	162
4X4UH	**28**	**1,081,262**	**1250**	**338**
4X4VL	**7**	**274,288**	**309**	**158**
4Z4DX	**3.5**	**379,652**	**352**	**182**
4Z4OL	**1.8**	**1,014**	**14**	**13**
		JAPAN		
JR1RNC	**A**	**1,160,796**	**1129**	**364**
JA1IDY	**A**	**838,980**	**932**	**316**
JA6CNL	**A**	**433,566**	**507**	**333**
JH7UJN	"	374,612	572	238
JF1SEK	"	371,010	543	249
JF3CCN	"	335,289	539	219
JA1YCL	"	228,896	497	184
		(Opr: JG1GQB)		
JH3AIU	"	132,300	275	175
JR3XEX	"	100,215	258	153
JA6BIF	"	97,674	254	146
JH1MTR	"	92,700	250	150
JA1OP	"	37,788	149	94
JE6PWW	"	22,950	104	75
JI1PCN	"	20,592	105	66
JF2PKI	"	11,247	76	69
JF1LKM	"	10,106	64	62
JA8CAQ	"	4,142	40	38
JA4AQR	"	2,760	32	30
JA9FAI	**28**	**433,160**	**568**	**280**
JA1FO	**28**	**139,684**	**265**	**188**
JA8TRT	"	100,532	307	164
JF2VDY	"	87,200	234	160
JF3PNO	"	39,324	170	116
JA3EQC	"	38,318	154	98
JE2SOY	"	17,390	105	74
JA4VZX/3	"	5,148	51	44
JA1AAT	"	3,762	43	33
JR1CER	"	918	18	17
JH3LPT	**21**	**1,214,356**	**1127**	**386**
JH1EAQ	**21**	**776,776**	**896**	**308**
JA7YAB	"	614,225	792	311
		(Opr: JR7VMF)		
JA9CWJ	"	289,170	429	238
JH3CXL	"	214,182	367	219
JR1JUR	"	57,008	180	112
JA4BFL	"	32,550	124	105
JR4ISK	"	30,858	134	111
JH7BRG	"	25,272	108	81
JA7ECT	"	8,428	60	49
JH8LIZ	"	4,796	46	44
JI3DPA	"	1,755	29	27
JA2KPV	"	1,008	25	16
JA1AJA	"	84	7	7
JH1OJU	**14**	**663,494**	**778**	**302**
JE3SEN	**14**	**470,076**	**659**	**258**
JG1RVR	"	425,488	603	262
JG1QGQ	"	33,708	128	106
JA3ARM	"	25,392	117	92
JA1OUM	"	1,287	43	13
JK1LUY	"	559	15	13
JA1RWI	**7**	**163,856**	**258**	**152**
JA6YBX	"	540	11	9
		(Opr: JE6QMM)		
JA7JWF	**3.5**	**1,640**	**25**	**20**
JA2DCN	"	208	13	13
JE1SPY	1.8	32	26	16
		MONGOLIA		
JT8WA	**A**	**1,827,856**	**1902**	**368**
		(Opr: OK1DWA)		
		QATAR		
A7XE	**7**	**254,716**	**303**	**154**
		SAUDI ARABIA		
HZ1HZ	**A**	**1,041,026**	**1111**	**322**
		SINGAPORE		
9V1TL	**A**	**126,581**	**410**	**169**
		WEST MALAYSIA		
9M2KG	**A**	**406,062**	**702**	**306**

U.S.S.R.

		ASIATIC		
UV9AH	**A**	**1,569,451**	**1501**	**377**
UW9WB	**A**	**1,397,440**	**1148**	**352**
UA9AFG	"	436,632	584	276
UA9WFB	"	320,551	511	253
UA9FCI	"	319,580	480	190
UA9UAR	"	298,958	557	214
UA9MDJ	"	36,050	138	103
UA9MR	"	25,800	104	75
UA9WFJ	"	21,200	116	80
UA9NP	**28**	**107,163**	**280**	**147**
UA9AAP	"	43,904	167	112
UA9AHS	"	17,404	105	76
UA9OBL	**21**	**1,123,188**	**1210**	**381**
UA9CES	"	51,684	162	118
UA9ADQ	**14**	**924,536**	**994**	**326**
UA9YBR	"	67,344	212	138
UA9CLQ	"	4,070	44	37
UA9CBM	**3.5**	**119,664**	**200**	**108**
UAØZBF	**A**	**1,083,852**	**1118**	**357**
UWØAF	**A**	**715,596**	**853**	**294**
UAØAG	"	592,992	773	288
UAØSY	"	196,350	421	187
UAØLAF	"	74,820	244	129
UAØDP	"	64,774	171	139
UAØKCL	"	48,585	160	123
UAØSGJ	**21**	**42,864**	**154**	**114**
UAØSGL	"	37,065	155	105
UAØFDH	**14**	**146,400**	**350**	**183**
UAØFBP	"	58,764	261	166
UAØKBV	"	40,068	140	108
UAØOAA	"	714	17	14
UAØLDO	"	429	13	13
UAØQDC	"	374	24	17
		AZERBAIJAN		
UD6DKW	**A**	**236,672**	**392**	**172**
UD6CN	**14**	**20,867**	**95**	**77**
		GEORGIA		
UF6FEQ	**14**	**19,872**	**100**	**72**
		KAZAKH		
UL7MAR	**A**	**1,922,671**	**1488**	**397**
UL7CT	**A**	**1,236,171**	**1409**	**321**
UL7GAA	"	435,780	670	269
UL7GAV	"	180,594	369	158
UL7EAH	"	21,000	102	75
UL7CBM	**28**	**102,300**	**286**	**150**
UL7NCL	"	57,239	195	119
UL7PBY	**21**	**916,168**	**921**	**359**
UL7QF	**21**	**512,720**	**715**	**272**
UL7PBI	"	22,794	107	87
UL7CAD	**7**	**169,652**	**239**	**146**
UL7JAW	"	90,288	186	108
		KIRGHIZ		
UM8MAZ	**A**	**116,436**	**305**	**124**
UM8MBA	"	34,592	150	94
UM8MCY	**28**	**75,692**	**242**	**127**
UM8PAC	**21**	**286,220**	**610**	**220**
		TADZHIK		
UJ8JAS	**21**	**1,134,050**	**1257**	**370**

TURKOMAN

UH8BO	**28**	**54,234**	**175**	**131**
UH8EAD	**7**	**18,308**	**69**	**54**
UH8EAA	3.5	1,870	20	17

UZBEK

UI8BI	**A**	**194,292**	**400**	**189**
UI8ADQ	"	3,564	38	33
UI8TAA	**14**	**9,593**	**66**	**53**

EUROPE

AUSTRIA

OE3DSA	**A**	**1,047,306**	**1063**	**377**
OE5CWL	**21**	**27,456**	**120**	**88**
OE7SHI	**14**	**202,594**	**509**	**203**

BELGIUM

ON4FD	**A**	**1,094,912**	**1289**	**364**
ON4XG	"	149,465	370	179
ON5WL	**3.5**	**25,092**	**149**	**82**

BULGARIA

LZ2AF	**A**	**855,400**	**992**	**364**
LZ2BR	**A**	**104,814**	**277**	**162**
LZ2KKZ	"	74,500	334	149
		(Opr: Dimitxr Genschev)		
LZ1ZF	"	8,996	67	52
LZ1IA	"	8,321	61	53
LZ2AG	"	7,440	80	60
LZ1QI	**28**	**13,536**	**92**	**72**
LZ2KLC	3.5	7,854	71	51
LZ1HY	"	3,666	41	39

CRETE

SV9AW/9	**A**	**9,246**	**104**	**69**
		(Opr: KB2YB)		

CZECHOSLOVAKIA

OK2BWH	**A**	**346,032**	**599**	**243**
OK2UAS	**A**	**340,860**	**619**	**260**
		(Opr: OK2WHT)		
OK1AZI	"	320,021	558	239
OK1KZ	"	175,717	425	199
OK1MKU	"	150,161	306	187
OK3FON	"	102,720	254	160
OK2YN	"	101,320	230	170
OK2LN	"	96,195	287	159
OK1MAA	"	79,360	232	160
OK1AJY	"	71,456	249	154
OK2SGW	"	55,808	175	128
OK1JVQ	"	49,084	300	172
OK2PBG	"	48,314	150	119
OK1MZO	"	45,885	168	115
OK1DVK	"	41,990	143	130
OK3BT	"	36,050	150	103
OK1DGN	"	26,829	122	99
OK3EQ	"	26,691	107	93
OK1AOU	"	20,304	122	72
OK3BA	"	15,540	87	70
OK1AEH	"	15,375	88	75
OK3CES	"	9,593	69	53
OK1FIM	"	6,292	51	44
OK1APS	"	5,900	68	50
OK2SWD	"	2,158	30	26
OK3CXW	"	2,072	33	28
OK1TW	"	442	14	13
OK1IAR	"	300	11	10
OK3CDX	**28**	**66,411**	**212**	**141**
OK3KYR	"	29,580	133	85
		(Opr: OK3DT)		
OK3VSZ	"	17,850	96	70
		(Opr: OK3ZAF)		
OK1AXK	"	1,000	21	20
OK1AES	**21**	**253,045**	**448**	**229**
OK2QX	**21**	**141,897**	**285**	**203**
OK1FAR	"	135,956	308	164
OK2EC	"	38,880	146	96
OK1DMJ	"	27,930	112	98
OK1JST/p	"	10,385	107	67
OK1PCL	"	3,264	36	32
OK1ASQ	"	672	16	16
OK3KFF	**14**	**808,945**	**1135**	**307**
		(Opr: OK3CQW)		
OK1FV	**14**	**412,068**	**692**	**276**
OK3KWW	"	322,890	632	235
		(Opr: OK3MB)		
OK3RXA	"	183,643	503	227
		(Opr: OK3ZMD)		
OK2BUJ	"	62,748	208	126
OK3YDP	"	53,795	222	145
OK1ALQ	"	34,020	176	90
OK1AXB	"	33,124	135	98
OK3CAU	"	21,168	109	72
OK2BBQ	"	13,144	114	62
OK1JPH	"	5,016	50	44
OK1JDJ	"	3,696	38	33
OK1AEZ	**7**	**63,392**	**149**	**112**
OK3TAY	"	8,470	62	55
OK1TJ	"	2,108	32	31
OK1XG	"	1,144	22	22
OK3KFO	**3.5**	**155,520**	**432**	**160**
		(Opr: OK3CUM)		
OK3CEI	**3.5**	**71,120**	**253**	**127**
OK2BSG	"	70,560	248	126
OK3BRK	"	48,510	181	98
OK3CAQ	"	48,400	207	110
OK3TFY	"	18,300	117	75
OK1AXA	"	14,626	90	71
OK1MKI	"	11,780	95	62
OK1DZD	"	8,288	80	56
OK2HI	"	7,488	67	48
OL3AXS/p	**1.8**	**4,428**	**65**	**41**
OK3CWQ	**1.8**	**3,361**	**45**	**37**
OK1KUA	"	2,604	42	31
OK3CQR	"	2,520	48	35
OK2BWM	"	2,088	32	29
OL6BAB/p	"	1,800	42	30
OL8CNI	"	234	15	13
OK2OU	"	204	18	17

DENMARK

OZ7BW	**A**	**279,864**	**449**	**234**
OZ7BG	**A**	**82,150**	**211**	**155**
OZ1EXZ	"	80,210	240	130
OZ2NU	"	41,412	164	116
OZ6KS	"	38,913	184	119
OZ4HW	"	32,130	138	119
OZ4CG	"	7,008	56	48
OZ1GAX	"	3,168	37	33
OZ2RH	"	3,060	34	34
OZ1FAO	"	1,702	28	23
OZ1AUX	**28**	**29,593**	**125**	**101**
OZ7JZ	**21**	**352,560**	**531**	**260**
OZ6XR	**21**	**200,186**	**420**	**181**
OZ1EUO	"	1,254	23	22
OZ9TL	"	704	16	16
OZ5KU	**14**	**205,955**	**480**	**229**
OZ2JZ	**7**	**150,592**	**353**	**181**

ENGLAND

G3FXB	**A**	**1,902,930**	**1493**	**411**
G3ESF	"	401,448	702	258
G2AJB	"	128,100	314	183
G4GIR	**28**	**155,856**	**401**	**204**
G3XQX	**21**	**25,755**	**150**	**101**
G3KDB	**14**	**1,041,925**	**1207**	**355**
G4BWP	**7**	**721,630**	**677**	**305**

FINLAND

OH3YI	**A**	**1,034,880**	**1157**	**385**
OH5UO	**A**	**211,812**	**410**	**228**
OH2VZ	"	127,596	285	186
OH1RZ	"	124,062	285	174
OH2DN	"	120,231	280	219
OH7NW	"	78,183	242	153
OH9TD	"	59,184	199	144
OH1KC	"	49,911	163	127
OH6MM	"	36,456	161	124
OH5PT	"	17,750	92	71
OH2BQG	"	11,470	88	62
OH1PY	"	3,808	44	34
OH5OZ	**28**	**20,566**	**111**	**91**
OH3EW	"	15,352	105	76
		(Opr: OH2OT)		
OH6RC	"	7,482	66	58
OH2JG	**21**	**439,008**	**655**	**269**
OH6LK	**21**	**201,045**	**400**	**195**
OH6DH	"	46,116	170	108
OH1ZE	"	27,027	121	99
OH2BVR	"	19,422	110	78
OH2AP	"	576	19	16
OH1CI	"	260	13	13
OH1PS	**14**	**840,595**	**1042**	**365**
OH3LA	"	89,433	339	171
OH6TS	"	28,100	120	100
OH6FP	**7**	**67,208**	**219**	**124**
OH8PF	**3.5**	**123,240**	**361**	**158**
OH2BSA	"	23,908	135	86

FRANCE

F6DKV	**A**	**113,634**	**497**	**118**
F6GCP	**A**	**112,996**	**350**	**164**
F8VJ	"	55,954	139	101
F6GNG	"	1,372	38	28

GERMANY (F.R.G.)

DK8AX	**A**	**347,136**	**536**	**256**
DF3QN	"	59,714	164	146
DF2RG	"	6,566	58	49
DF8AN	"	4,386	69	51
DL2JO	**28**	**8,265**	**61**	**57**
DK5OS	"	1,180	22	20
YO7AWZ/DJ	"	336	13	12
DL8OE	**14**	**334,144**	**850**	**184**
DL1AM	**14**	**72,540**	**186**	**186**
DF8AY	"	6,000	76	50
DL9HN/A	**7**	**18,018**	**105**	**77**
DK3QJ	**3.5**	**79,968**	**261**	**136**

GERMANY (G.D.R.)

Y31XA	**A**	**558,556**	**808**	**311**
Y43VI	**A**	**445,524**	**681**	**271**
Y47YN	**A**	**431,054**	**700**	**281**
Y46XL	"	419,337	657	279
Y51ZE	"	399,863	623	281
Y46WO	"	289,674	514	242
Y25TG	"	217,685	440	221
Y44XI	"	168,064	422	202
Y47XN	"	144,384	375	188
Y53YN	"	136,510	348	187
Y22RK	"	119,880	383	180
Y33VA	"	94,024	248	161
Y22WK	"	82,460	320	155
Y23CM	"	80,444	202	169
Y58YF	"	77,614	245	151
Y27HL	"	48,048	190	112
Y31ZE	"	45,356	179	116
Y22HF	"	30,174	124	94
Y67ZG	"	22,446	106	87
Y57YL	"	22,088	123	88
Y24EA	"	13,260	75	60
Y31SK	"	11,935	87	77
Y33UO	"	9,945	72	51
Y21DC	"	7,018	81	58
Y27VH	"	6,681	55	51
Y21HI/A	"	5,852	51	44
Y23PF/A	"	4,884	44	37
Y46YH	"	4,704	48	48
Y38ZB	"	3,040	43	40
Y34YF	"	2,813	33	29
Y38WG	"	2,436	31	29
Y31XH	"	1,825	27	25
Y26MH	"	1,426	35	31
Y54ZA	"	1,210	23	22
Y54ZL	"	1,155	25	21
Y23IL	"	990	19	18
Y35XA	"	576	21	18
Y23ZF	"	480	16	12
Y34SE	**28**	**10,020**	**71**	**60**
Y87WL	"	520	14	13
Y22TO	**21**	**49,126**	**150**	**121**
Y21XC	**21**	**16,786**	**85**	**77**
Y37ZE	"	13,869	80	67
Y22TD	"	12,980	76	59
Y26SO	"	9,072	71	63
Y22ML	"	846	18	18
Y22FE/A	"	108	6	6
Y51XE	**14**	**80,652**	**270**	**143**
Y24WL	**14**	**14,136**	**90**	**76**
Y38YE	"	7,936	82	64
Y24HG	"	7,076	102	58
Y21EA	"	6,660	74	60
Y23GB	"	4,620	55	44
Y59YM	"	4,268	47	44
Y23JA	"	481	13	13
Y23BF	"	189	9	9
Y24IF/p	**7**	**203,698**	**376**	**197**
Y45SA	**7**	**162,564**	**360**	**186**
Y26IL	"	4,876	49	46
Y48VO	3.5	4,144	51	37
Y23VB	"	50	5	5

GIBRALTAR

ZB2EO	**A**	**379,500**	**873**	**276**

GREECE

SV1NN	**A**	**239,795**	**569**	**241**
SV0AU	**21**	**251,175**	**554**	**255**

HUNGARY

HA0HW	**A**	**424,591**	**728**	**281**
HA3NU	"	72,354	225	147
HA1UB	"	60,345	254	135
HA5KFL	**21**	**1,020,260**	**1067**	**367**
		(Opr: HA5PP)		
HA1KVK	"	6,834	56	51
HA3IB	**14**	**148,539**	**430**	**201**
HA8DU	**14**	**143,994**	**350**	**206**
HA2MN	"	108,965	289	185
HA8DT	"	89,562	274	177
HA1ZG	"	58,520	218	140
HA7RB	**7**	**91,808**	**279**	**151**
HA6OA	**3.5**	**54,280**	**238**	**115**
HA7RO	**3.5**	**44,178**	**203**	**111**
HA8KQK	"	14,632	96	62
		(Opr: Deim Ferenc)		
HA0HG	"	5,244	71	46
HA7SR	"	3,510	50	39
HA3GE	"	1,612	44	26
HA8KVO	"	40	8	4
		(Opr: HA8-163)		

IRELAND

EI1DH	**21**	**248,844**	**539**	**233**

ISLE OF MAN

GD3TXF	**A**	**940,555**	**1105**	**349**

ITALY

I2VXJ	**A**	**989,906**	**1053**	**346**
I2RVW	**A**	**290,820**	**514**	**222**
I2UIY	"	61,696	298	128
I0YWK	"	26,520	133	102

MALTA

9H1CH	**28**	**307,433**	**668**	**259**

NETHERLANDS

PA0GAM	**A**	**429,520**	**732**	**260**
PA0DIN	**A**	**103,713**	**256**	**181**
PA0LVB	"	98,784	249	168
PA0KHS	"	6,960	69	58
PA3BDK	"	2,184	51	24
PA3AMA	"	1,479	33	17
PA0LRK	"	1,357	23	23
PA0TA	**21**	**30,923**	**115**	**107**
PA3ASC	**14**	**88,434**	**288**	**153**

NORWAY

LA7JO	**A**	**887,744**	**1103**	**352**
LB1GB	**A**	**251,873**	**600**	**233**
LA9OI	"	11,937	76	69
LA5BS	"	1,426	26	23
LA3UG	"	1,078	23	22
LA8UX	21	2,226	50	21
LA7A	**14**	**434,700**	**760**	**300**
		(Opr: LA8UL)		
LA7XB	**14**	**84,108**	**273**	**163**

POLAND

SP8GQU	**A**	**974,795**	**1139**	**331**
SP3HLM	**A**	**441,934**	**622**	**298**
SP9DBA	**A**	**425,796**	**686**	**259**
SP5BR	"	321,867	501	273
SP8EMO	"	316,674	551	241
SP8HRA/9	"	252,154	438	217
SP9BBH	"	184,535	362	221
SP7DTP	"	102,455	300	155
SP2JGK	"	100,419	305	179
SP9AKD	"	92,790	271	156
SP9CVY	"	90,000	258	144
SP2HBP	"	80,785	244	151
SP3BYZ	"	54,932	194	124
SP3CB	"	44,118	155	114
SP3IOE	"	33,495	154	105
SP3XR	"	29,256	131	92
SP6FER	"	11,277	74	63
SP7AWA	"	7,584	57	48
SP2BIK	"	5,412	50	41
SP8GSC	"	4,485	43	39
SP8FNA	"	3,885	41	37
SP8GUV	"	3,816	41	36
SP9AOA	"	1,426	28	23
SP6BYF	"	867	18	17
SP9DTH	"	560	14	14
SP9CAV	**28**	**37,665**	**159**	**93**
SP9CTW	"	3,080	39	35
SP7BFO	"	308	12	11
SP5JTR	**21**	**90,398**	**223**	**154**
SP5ANX	**21**	**69,138**	**210**	**138**
SP5ALV	"	45,320	165	110
SP5AD	**14**	**190,361**	**421**	**233**

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866A	20.00
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KC1F	**2,150,261**	N6YK/VP2A	1,893,504
ZW4OD	1,998,000	KL7RA	1,864,584
KP4KK/DU2	1,962,054	JTØWA	1,827,856

SINGLE BAND

28 MHz		21 MHz	
KG6DX	1,238,806	**LU8DQ**	**2,163,182**
4X4UH	1,081,262	KP4CC	1,717,632
KP4EQF	577,500	YU3BO	1,550,390
JA9FAI	433,160	VE3BMV	1,534,669
ZL2RY	343,107	K6LL/7	1,433,457
9H1CH	307,433	JH3LPT	1,214,356

14 MHz		7 MHz	
YU4GD	1,468,971	**OA4AWD**	**1,137,504**
YU3EY	1,416,128	G4BWP	721,630
SM5GMG	1,342,800	VE3KZ	649,288
KP2A	1,141,005	EA9GT	579,824
G3KDB	1,041,925	K7RI	535,464
UA9ADQ	924,536	KN6M	441,610

3.5 MHz		1.8 MHz	
4Z4DX	379,652	YU3EF	24,360
YU2BOP	175,104	UC2ACA	23,940
OK3KFO	155,520	UR2RCU	18,972
OH8PF	123,240	OL3AXS/p	4,428
UA9CBM	119,664	OK3CWQ	3,361
EA8RL	108,648	OK1KUA	2,604

QRPp

OA8V	**AB**	**444,768**	JA1EF	28	46,368
N3RS	AB	419,100	**4X6NDE**	**21**	**655,500**
N2AA	AB	361,264	UB5EDM	14	127,624
N4KG	AB	327,574	OK1DCP	7	48,750
JA1MCU	AB	319,545	UAØLCQ	3.5	2,369
AJ7S	AB	228,245	UA9CJA	1.8	1,118

MULTI-OPERATOR

SINGLE TRANSMITTER

UK2PCR	**3,539,160**	UK2PAP	2,838,498
HG6V	**3,325,119**	N4WW	2,696,980
VE1DXA	3,258,240	G6UW	2,614,584
OHØBH	**3,254,088**	JA9YBA	2,591,640
4U6ITU	3,151,798	**VE5DX**	**2,536,424**

MULTI-TRANSMITTER

YTØR	**7,545,448**	K5IU/C6A	4,688,730
KH6XX	7,424,460	AI6V	4,174,927
YOØA	5,833,456	UK5IBB	3,807,000

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SINGLE OPERATOR

All Band	**KC1F**	**2,150,261**
28 MHz	N4ZC	136,086
21 MHz	**K6LL/7**	**1,433,457**
14 MHz	N2MM	859,320
7 MHz	K7RI	535,464
3.5 MHz	K5UR	7,968
1.8 MHz	W9CG	112
QRPp	N3RS	419,100

MULTI-OPERATOR

Single Xmitter	N4WW	2,696,980
Multi Xmitter	AI6V	4,174,927

SP6UK	**14**	**79,380**	**256**	**162**
SP6ATG	"	74,844	223	154
SP2JXK	"	47,520	210	120
SP5DZT	"	36,072	152	108
SP2GOW	"	29,920	120	110
SP5MBA	"	26,487	154	109
SP9EMI	"	24,795	151	95
SP5CJQ	"	24,300	154	100
SP6FRF	"	19,355	132	79
SP9JEM	"	18,675	114	75
SP8HPW	"	16,856	111	86
SP5BLI	"	13,629	97	77
SP7EJS	"	4,060	42	35
SP9SK	"	2,556	41	36
SP4JAE	"	2,550	33	30
SP5FLB	"	1,200	22	20
SP4EEZ	**7**	**204,572**	**407**	**199**
SP9HWN	**7**	**53,286**	**200**	**107**
SP8HZZ	"	33,840	152	94
SP5ES	"	23,254	96	77
SP3DOI	"	19,584	97	72
SP5LGP	"	14,762	69	61
SP5LGT	"	12,980	64	59
SP3KTC	"	5,084	62	41
		(Opr: SP-1151-PO)		
SP2HMT	**3.5**	**61,732**	**241**	**122**
SP3ZDB	"	10,200	100	50
SP6BNR	**1.8**	**1,080**	**30**	**20**
SP9GDB	"	189	13	9
SP3GVX	"	84	7	6

RHODES

SVØBV/5	**14**	**51,471**	**312**	**133**

ROMANIA

YO6VZ	**A**	**320,760**	**696**	**243**
YO3CR	**A**	**237,600**	**431**	**264**
YO7AWQ	"	53,392	203	142
YO2BKK	"	27,176	190	79
YO8KOA	"	2,132	36	26
		(Opr: YO8CGG)		
YO6ADW	"	682	31	22
YO5AVP	**28**	**8,788**	**67**	**52**
YO4BBH	"	3,136	40	32
YO8DD	**21**	**74,296**	**220**	**148**
YO8KGF	**21**	**67,210**	**235**	**130**
		(Opr: YO8BNM)		
YO2BPM	"	19,019	103	77
YO6UO	**14**	**49,021**	**199**	**149**
YO8FZ	"	12,804	80	66
YO6AW	"	12,320	107	70
YO3TU	"	192	8	8
YO2CGZ	7	4,130	40	35
YO2BKG/3	**3.5**	**14,916**	**110**	**66**
YO8BDV	**3.5**	**11,220**	**100**	**55**
YO4FM	"	1,610	36	23
YO4CSL	"	442	14	13
YO6BTY	"	98	7	7

SARDINIA

ISØMH	**A**	**173,130**	**579**	**174**
ISØMVE	**A**	**103,999**	**331**	**179**

SPAIN

EA7XQ	**A**	**663,156**	**859**	**327**
EG2IA	**A**	**527,040**	**706**	**270**
EA1JO	"	258,781	637	251
EA2CR	"	66,424	227	152
EA5TX	"	35,638	154	103
ED5AR	"	17,952	99	88
ED7ATE	**21**	**284,123**	**600**	**259**
EC1GY	**21**	**105,948**	**265**	**162**
EC2GR	"	59,220	200	140
EA2DT	"	43,194	147	138
EC5AAI	"	260	13	13
EA3CRX	**14**	**676,664**	**983**	**328**
EA3CRU	**14**	**115,507**	**300**	**203**
EA3PE	"	67,940	337	158
EA3GT	"	740	25	20
EC5QE	7	378	11	9
EA7OH	**3.5**	**20,850**	**103**	**75**

SWEDEN

SM2HAK	**A**	**968,994**	**1115**	**369**
SMØCCE	**A**	**759,544**	**995**	**361**
SKØLM	**A**	**594,336**	**956**	**328**
		(Opr: SMØDRD)		
SMØDJZ	"	581,790	798	330
SM5BAX	"	443,272	676	268
SM5CMP	"	294,508	507	244
SM5DAC	"	243,162	483	237
SM7DER	"	223,822	470	227
SM2CFZ	"	132,678	359	182
SM6HCJ	"	112,326	281	194
SM7KIL	"	97,755	300	133
SMØCGO	"	87,300	248	150
SM2DIR	"	63,512	256	136
SM5BDV	"	9,072	63	54
SM6AYM	"	8,131	58	47
SM5ADE	**28**	**71,920**	**238**	**155**
SM7BKH	"	38,220	150	105
SM3DXV	"	798	22	19
SM2JUR	**21**	**176,688**	**399**	**216**
SMØKV/Ø	"	68,112	196	144
SM2LIY	"	67,784	206	148
SM7LSU	"	14,700	84	70
SM5GMG	**14**	**1,342,800**	**1375**	**400**
SMØBVQ	"	77,228	238	172
SM2CEW	"	22,000	127	88
SMØAJU	**7**	**353,580**	**472**	**249**
SM6BXV	"	8,514	51	43
SM6CPY	**3.5**	**45,570**	**209**	**105**
SM6ID	"	45,200	193	113

SWITZERLAND

HB9AW	**A**	**107,460**	**246**	**199**
HB9AGH	"	55,806	173	142
HB9BRQ	28	3,672	43	36

WALES

GW3NYY	**14**	**43,323**	**200**	**127**

YUGOSLAVIA

YT2D	**A**	**2,826,075**	**1958**	**525**
		(Opr: YU2RA)		
YU2WV	**A**	**920,505**	**1095**	**327**
YU7NZR	"	51,712	171	128
YU1RA	"	1,690	27	26
YU2CQ	**28**	**303,318**	**563**	**246**
YU3BO	**21**	**1,550,390**	**1473**	**394**
YU7OCV	**21**	**511,065**	**724**	**277**
YU7PFT	"	15,504	86	68
YU1OVU	"	13,825	81	79
YU4GD	**14**	**1,468,971**	**1405**	**441**
YU3EY	**14**	**1,416,128**	**1401**	**406**
YU3DDX	"	862,988	1065	343
YU2OG	"	741,240	1086	353
YU7OCZ	"	249,000	539	250
YU4VWW	"	66,308	203	137
YU3VM	**7**	**341,544**	**469**	**228**
YU7SF	**7**	**193,614**	**367**	**183**
YU1OWW	"	432	16	12
YU2BOP	**3.5**	**175,104**	**465**	**171**
YU3TUX	**3.5**	**52,080**	**225**	**105**
YZ9VC	"	24,070	145	83
YU3EF	**1.8**	**24,360**	**140**	**84**
YU7ECD	"	2,100	39	30

U.S.S.R.

BYELO-RUSSIA

UC2SE	**A**	**162,240**	**413**	**208**
UC2LBE	"	550	13	11
UC2OCS	**21**	**304,706**	**509**	**262**
UC2ODA	**14**	**688,653**	**965**	**357**
UC2WBL	"	136,512	370	192
UC2AFB	"	5,250	57	50
UC2WBJ	**3.5**	**46,762**	**217**	**103**
UC2ACA	**1.8**	**23,940**	**142**	**70**

ESTONIA

UR2OI	**28**	**24,276**	**143**	**102**
UR2NP	**21**	**169,884**	**358**	**198**
UR2RDQ	"	127,020	288	174
UR2RHF	"	34,944	146	104
UR2RBH	"	34,026	140	107
UR2ZN	**14**	**100,897**	**321**	**163**
UR2MX	"	6,012	120	36
UR2FU	**7**	**84,390**	**271**	**145**
UR2RSA	"	53,580	205	114
UR2RKS	**3.5**	**97,428**	**313**	**138**
UR2JW	"	38,218	200	97
UR2RCU	**1.8**	**18,972**	**130**	**62**

EUROPEAN RUSSIA

UW3HV	**A**	**1,382,693**	**1521**	**403**
UV3FL	**A**	**257,337**	**470**	**243**
UA6AJG	**A**	**201,042**	**379**	**219**
UA1ZDW	"	190,520	419	220
UA3DSS	"	108,928	321	184
UA3DIW	"	105,591	266	183
UA6LDF	"	74,400	337	150
UA3DQS	"	58,960	229	134
UA3PBY	"	53,156	189	137
UA3XBB	"	40,777	200	121
UA3AEX	"	40,176	171	124
UA3TAG	"	39,558	155	114
UA3DQZ	"	35,970	153	110
UA3YAO	"	33,919	191	107
UA3LCC	"	32,968	146	104
UA6LFQ	"	32,616	162	108
UA1OCT	"	32,200	135	92
UA3TAM	"	31,570	140	110
UA4HFG	"	27,342	137	93
UA3DRT	"	21,414	144	83
UA4HAN	"	10,731	89	49
UA3MDX	"	7,950	66	53
UA3LAR	"	7,905	65	51
UA1CGX	"	7,830	60	45
UA6LXZ	"	6,256	50	46
UA1DF	"	4,590	46	45
UA1WEA	"	4,192	42	32
UA3TEW	"	2,322	33	27
UA4HFK	"	1,960	32	28
UA3QEB	"	1,750	30	25
UA3AJR	"	1,000	21	20
UA6ALL	"	833	18	17
UA6ALA	"	705	16	15
UA3EAT	**28**	**5,148**	**48**	**39**
UW3UO	**21**	**841,071**	**2317**	**363**
UA4CK	**21**	**392,430**	**644**	**309**
UA1QAU	"	375,708	613	262
UA3RDH	"	112,566	270	219
UV3DN	"	46,585	183	121
UA3DCX	"	26,040	125	93
UA6AJO	"	12,844	101	76
UA1ZCU	"	2,987	37	29
UA4FAZ	**14**	**560,805**	**826**	**327**
UA3TDK	**14**	**389,061**	**677**	**311**
UW6CV	"	180,600	546	215
UA1QBV	"	123,018	303	202
UA3ADO	"	101,936	343	184
UA3RCT	"	71,476	260	167
UA3ESN	"	41,783	200	127
UA3ICF	"	38,232	170	118
UA4HAM	"	29,224	170	104
UA3WI	"	28,301	120	91
UA1ZCX	"	24,570	144	105
UA6ARP	"	16,992	98	59
UA4YAZ	"	12,792	99	78
UA3AGF	"	11,440	114	80
UA1BC	"	10,500	83	60
UA3RFV	"	10,304	75	64
UA4ACA	"	8,851	67	53
UA4FDE	"	6,490	75	59
UA6LLI	"	4,278	51	46
UZ3TG	"	2,911	57	41
UA3IDT	"	2,175	31	29
UA3DGI	"	540	16	15
UA6AKT	"	390	15	15
UA3AFQ	**7**	**140,352**	**330**	**172**
UA6LFX	**7**	**77,220**	**200**	**110**

Say You Saw It In CQ

UA4PCI	"	55,952	180	104
UA1AUA	"	29,624	145	92
UA3TBW	"	8,888	73	44
UA3AGL	**3.5**	**62,478**	**239**	**117**
UA4PDT	"	8,976	72	51
UA1ZBQ	1.8	112	8	8
KALININGRAD				
UA2FCB	**A**	**15,420**	**85**	**80**
UA2EC	**21**	**270,070**	**443**	**239**
UA2FEM	**7**	**35,378**	**200**	**133**
UA2FCW	**1.8**	**5,822**	**71**	**41**
LATVIA				
UQ2GDQ	**A**	**1,705,455**	**1660**	**405**
UQ2PJ	"	30,264	131	104
UQ2GKM	"	17,176	97	76
UQ2GBJ	"	651	23	21
UQ2GCN	**14**	**48,026**	**195**	**118**
UQ2GDL	**7**	**157,296**	**355**	**174**
UQ2GEC	"	30,210	124	95
UQ2PM	**3.5**	**10,788**	**89**	**62**
UQ2GAG	"	3,872	80	44
UQ2PP	"	2,856	40	34
LITHUANIA				
UP2NK	**A**	**2,346,571**	**1955**	**443**
UP2BIM	**A**	**1,351,944**	**1404**	**396**
UP2BAO	"	631,712	837	304
UP2BDX	"	163,936	420	188
UP2BAR	"	129,514	308	154
UP2BFC	"	124,100	302	170
UP2BEG	"	85,560	302	155
UP2PBM	"	75,545	317	145
UP2BEW	"	75,168	288	144
UP2BBF	"	69,372	223	141
UP2BGX	"	9,540	80	53
UP2NA	**21**	**346,302**	**538**	**242**
UP2PCB	**21**	**65,262**	**188**	**149**
UP2AV	"	6,950	61	50
UP2BAW	**14**	**318,920**	**644**	**280**
UP2BEI	**14**	**199,728**	**434**	**228**
UP2BEX	"	105,276	365	186
UP2BV	"	22,770	119	90
UP2BIP	**7**	**45,312**	**176**	**118**
UP2BCU	"	35,020	157	103
UP2OU	**3.5**	**101,816**	**320**	**143**
UP2BFH	"	86,224	292	136
UP2BJQ	"	8,100	86	50
MOLDAVIA				
UO5AP	**A**	**527,904**	**972**	**312**
UO5OEK	**28**	**7,685**	**72**	**53**
UO5OBD	**14**	**383,700**	**746**	**300**
UO5ODB	"	10,136	70	56
UO5OGU	**7**	**59,472**	**230**	**118**
UO5ODA	"	35,700	140	102
UKRAINE				
UB5UKW	**A**	**487,808**	**738**	**296**
UB5ICS	**A**	**418,608**	**634**	**306**
UB5UKO	"	345,452	592	268
UT5HP	"	222,310	501	235
UB5UCR	"	197,628	322	172
UB5SBO	"	65,685	205	151
UB5LR	"	62,720	178	140
UB5ZA	"	60,830	197	110
UB5ABY	"	34,691	152	113
UT5CF	"	33,674	149	113
UB5UBI	"	27,930	153	105
UB5UCE	"	19,866	100	77
UB5DAV	"	12,348	84	63
UB5IPN	"	10,502	73	59
UB5EU	"	4,872	44	42
UB5WDD	"	2,052	31	27
UB5QAH	"	1,920	36	32
UB5ZAT	"	1,664	30	26
UB5ZAL	**28**	**19,456**	**104**	**73**
UB5UCJ	**21**	**206,488**	**403**	**212**
UB5ZEL	**21**	**99,790**	**255**	**170**
UB5RS	"	94,164	232	177
UB5VAW	"	7,540	70	58
UB5LAE	"	5,868	55	36
UB5ITU	**14**	**371,184**	**747**	**264**
UB5LCK	**14**	**331,925**	**676**	**275**
UT5EH	"	248,211	560	261
UB5QIA	"	151,512	368	214
UB5VK	"	116,800	347	200
UB5QAU	"	110,292	296	202
UB5JGM	"	82,498	286	167
UB5SG	"	71,400	250	168
UB5TAM	"	60,792	198	149
UB5JNW	"	42,840	195	126
UB5QDU	"	31,066	135	98
UB5EKO	"	6,498	71	57
UT5LN	"	4,841	50	47
UB5QKN	**7**	**169,456**	**367**	**178**
UB5WCJ	**7**	**129,030**	**303**	**170**
UB5FDP	"	49,946	159	113
UB5AEM	"	15,840	105	72
UB5WCW	**3.5**	**106,400**	**320**	**152**
UB5WF	**3.5**	**104,828**	**319**	**145**
UB5NDA	"	34,596	160	93
UY5TE	"	22,120	140	79

OCEANIA

AUSTRALIA				
VK3BLN	**A**	**605,514**	**756**	**273**
VK2AYD	**A**	**439,593**	**636**	**231**
VK2BQQ	"	361,260	469	223
VK3AEW/1	**A**	**220,096**	**384**	**181**
VK4UA	**A**	**173,655**	**372**	**153**
VK3CM	"	73,944	255	117
VK2DID	"	31,906	136	86
VK6FS	**28**	**207,364**	**378**	**188**
GUAM				
KG6DX	**28**	**1,238,806**	**1260**	**334**
HAWAII				
KH6B	28	27	3	3
AH6BL	**21**	**566,765**	**733**	**263**
KH6JWK	**21**	**53,130**	**161**	**110**
NEW ZEALAND				
ZL2RY	**28**	**343,107**	**587**	**201**
PHILIPPINES				
KP4KK/DU2	**A**	**1,962,054**	**1787**	**342**
W7LPF/DU2	**21**	**484,692**	**682**	**239**

SOUTH AMERICA

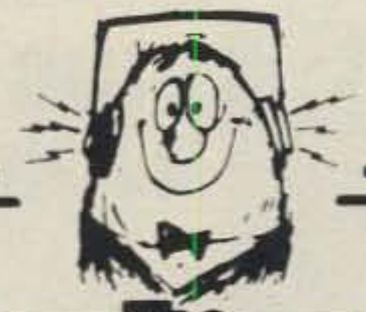
ARGENTINA				
LU9EIE	**A**	**1,060,424**	**1086**	**328**
LU1EWL	"	220,304	373	196
LU2DPW	**28**	**307,389**	**440**	**237**
LU8DQ	**21**	**2,163,182**	**1703**	**427**
BRAZIL				
ZW4OD	**A**	**1,998,000**	**1592**	**432**
PY2DLK	**A**	**1,017,060**	**1012**	**335**
PY2SHI	**A**	**389,092**	**511**	**239**
PY2BPR	"	103,275	232	153
PY1VT	"	100,196	230	148
PY2VFA	"	67,628	178	116
PY1MGH/4	"	17,466	85	71
ZZ5XFR	"	4,251	42	39
PY5ZW	**28**	**261,800**	**398**	**220**
PT7AW	**28**	**188,784**	**369**	**184**
PY7CW	21	133	7	7
PY5AAX/2	1.8	96	6	6
EASTER IS.				
CE0AE	**21**	**327,681**	**529**	**207**
ECUADOR				
W5VFO/HC7	**A**	**408,330**	**490**	**234**
PERU				
OA4AWD	**7**	**1,137,504**	**709**	**272**
URUGUAY				
CX8DT	**3.5**	**2,480**	**31**	**20**
VENEZUELA				
YV3AZC	**28**	**74,635**	**220**	**115**
YV3OS	"	15,132	144	78
YV10B	**21**	**715,995**	**760**	**315**
YV5APF	**14**	**77,952**	**203**	**128**
YV4BOU/2	**7**	**176,528**	**342**	**88**

MULTI-OPERATOR SINGLE TRANSMITTER

UNITED STATES			
N4WW	**2,696,980**	**2040**	**506**
KN5H	**1,780,716**	**1624**	**476**
N5JJ	1,738,620	1668	468
K2BA/4	1,627,373	1352	439
KK5I	1,432,704	1492	448
K3WX	1,368,171	1222	381
AC8W	**1,224,268**	**1259**	**421**
K8RWL	**1,149,795**	**1170**	**405**
AB2E	**1,122,360**	**1185**	**398**
K9MFI	**1,049,522**	**1122**	**389**
N9AAP	861,840	1099	380
KB8SX	858,884	917	332
AA4M	802,900	910	370
WB6SHL	**746,668**	**1021**	**346**
K8HV	725,040	853	342
AK9N	450,328	725	311
G4AAQ/KR8	378,144	660	288
N1EE	65,067	204	123
WD8JJA	21,824	111	88
NORTH AMERICA			
VE1DXA	**3,258,240**	**2201**	**480**
VE5DX	**2,536,424**	**2053**	**451**
VE3PCA	**1,974,021**	**1540**	**427**
VE7CNY	**1,447,188**	**1417**	**332**
KL7IB	**1,315,232**	**1458**	**368**
VE7ZZZ	1,048,450	1143	325
AFRICA			
4K1A	**79,249**	**158**	**97**
ASIA			
JA9YBA	**2,591,640**	**1971**	**460**
JA7YAA	**1,771,947**	**1696**	**423**
JA3YKC	**1,378,944**	**1256**	**384**
8J5SUN	1,359,992	1613	376
JA4YFH	1,339,674	1266	382
JA7YCQ	816,640	960	319
JA2YKA	784,224	999	288
JA0YAK	614,460	776	294
JA7YRR	532,092	652	278
JA7YAF	371,348	547	254
JA3YOD	79,344	247	116
JA9YAV	36,977	135	103
EUROPE			
HG6V	**3,325,119**	**2327**	**573**
OH0BH	**3,254,088**	**2853**	**492**
4U6ITU	**3,151,798**	**2749**	**482**
G6UW	**2,614,584**	**2201**	**474**
4N0RA	**2,420,040**	**2238**	**469**
DK0DI	**2,308,942**	**1950**	**446**
Y39ZO	**2,021,103**	**1909**	**441**
G4DSE	2,018,002	1826	427
OH3AA	**1,649,109**	**1751**	**413**
OH1AF	1,639,524	1724	431
HA5KKC/7	1,496,166	1611	343
TF3IRA	**1,481,965**	**1688**	**415**
GW4BRS	**1,464,840**	**1545**	**390**
OH5AD	1,423,618	1444	427
HA7KPL	1,232,055	1346	393
HA1KZZ	880,498	1145	323
OK3KEE	**725,436**	**979**	**324**
OZ5EDR	**723,235**	**916**	**331**
OH2AC	707,524	1278	316
OK2KWI	695,101	927	319
OZ1BII	676,728	1097	312
HA5KFN	676,030	861	335
HB9BLQ	**594,080**	**867**	**316**
OK1KRQ	580,496	917	292
HA4KYH	577,444	900	287
OH9UW	506,454	945	302
YU5FBE	497,958	802	298
LZ2KSQ	**459,256**	**766**	**278**
DF0AJ/p	416,776	653	236
HA8KAX	416,640	682	280
HA1KSL	378,924	613	273
OH6AS	333,022	643	269
LA4O	**290,646**	**584**	**241**
HA2KMR	286,308	519	241
YO6KEI	244,993	590	217

Chow break for expeditioner Nigel, G3TXF, during his operations from the Isle of Man as GD3TXY.

Next time, guys, please smile at the camera—Hi! G4AAQ/KR8 and N8BJQ operating from Huber Heights, Ohio. The FCC says it's legal and required for reciprocal licensed stations. (See comments in the write-up.)



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AZDEN PCS-3000/300	289
BENCHER BY-1	36
BUTTERNUT HF6V Vertical	99
CUBIC Astro 103	1150
DAIWA CNA2002 2.5 KW Auto Tuner	425
HAL CT2100	695
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HY-GAIN HAM IV Rotator	169
ICOM 720A/PS15	1275
ICOM 251A	585
ICOM 2AT	235
KLM KT34XA	465
KLM KT34A	315
KANTRONICS Interface	169
MFJ 496 Keyboard	289
MIRAGE B1016	239
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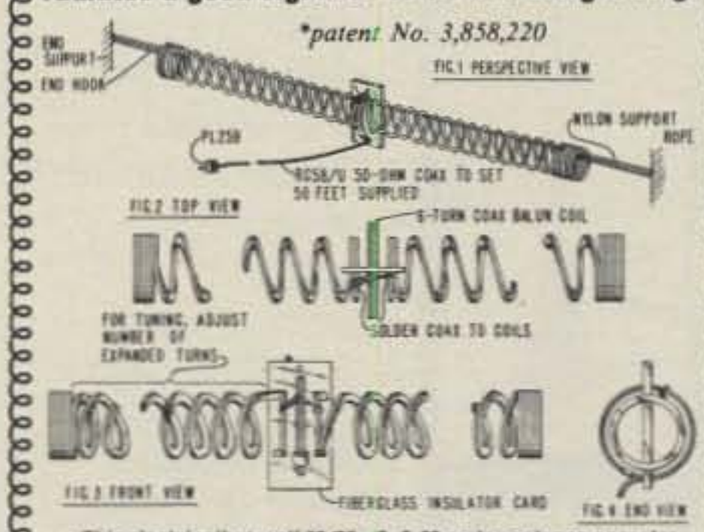

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GM3USL	**205,004**	**504**	**212**
LZ1KEZ	191,026	471	209
HA5KDB	134,421	364	173
OK2KWU	97,940	293	166
HA9KPE	95,152	273	152
HA3KNA	87,016	271	149
OK2KYC	83,053	235	157
OK3KGQ	74,080	286	160
OH8LB	70,312	223	136
OK3KJF	60,342	199	113
SP3PFR	39,710	142	110
OK1KYS	33,602	130	106
HA2KMG	29,484	146	108
SP1KRU	17,316	118	78
YU1ANO	15,912	85	72
OK1KTW	12,975	97	75
OK1KPX	12,159	89	63
LZ2KRR	1,750	27	25
OK1KMP	1,316	35	28
SP7KTE	198	9	9
	OCEANIA		
KH3AB	**1,547,451**	**1486**	**333**

U.S.S.R. CLUB STATIONS

	ASIA		
UK9OAC	**2,401,752**	**1940**	**456**
UK8MAA	**2,036,150**	**1845**	**422**
UK7GAA	**1,869,224**	**1732**	**406**
UK7BAL	1,587,640	1420	380
UK0FAD	**762,284**	**1205**	**298**
UK0LAH	183,792	394	168
UK9FER	58,212	185	108
UK0SAB	46,534	245	106
UK0AMM	35,939	154	83
UK0KAG	32,178	136	93
UK8AAI	29,400	120	100
UK0KAB	25,972	139	86
UK9ADS	23,316	122	87
UK9OBO	8,673	67	49
UK9CES	5,586	58	42
UK0LAA	3,100	53	20
UK6FAB	918	18	18
	EUROPE		
UK2PCR	**3,539,160**	**2598**	**540**
UK2PAP	2,838,498	2241	482
UK5MAF	**1,721,237**	**1634**	**427**
UK2PRC	1,590,390	1443	431
UK5YAA	990,036	1202	356
UK4WAB	**912,240**	**1269**	**362**
UK1AAU	826,288	1180	344
UK2BCC	397,256	750	254
UK3AAR	379,440	482	272
UK2BCO	377,568	682	263
UK5AAO	298,480	579	260
UK3TAN	224,028	620	252
UK6ACR	189,696	380	192
UK3XAM	162,852	309	246
UK6WAW	146,280	570	159
UK5UBE	115,070	340	185
UK1ZAS	80,325	350	153
UK1AAF	74,052	266	187
UK5UDX	63,591	230	123
UK3RAD	32,616	192	108
UK3DCF	19,227	112	87
UK5IGL	18,375	99	75
UK2AAP	10,857	114	77
UK3TBY	10,584	100	72
UK5ZAC	6,956	58	47
UK6AAY	2,457	43	39

MULTI-OPERATOR MULTI-TRANSMITTER WORLD WIDE

YT0R	**7,545,448**	**5026**	**632**
KH6XX	**7,424,460**	**4070**	**540**
YO0A	**5,833,456**	**4436**	**589**
K5IU/C6A	**4,688,730**	**3055**	**531**
AI6V	**4,174,927**	**2845**	**551**
UK5IBB	**3,807,000**	**3238**	**540**
HG1W	**3,420,578**	**2567**	**526**
JA3YBF	**3,087,336**	**2598**	**476**
W3GM	**2,618,424**	**1967**	**492**
HG5A	2,580,688	2183	496
JH1YDT	2,309,694	1812	458
JA2YEF	1,762,641	1678	423
JA1YXP	1,465,312	1187	464
K2UA	**392,840**	**577**	**244**
JA6YDH	86,997	223	141
NN3SI	38,090	207	130

CHECK LOGS: The following were used for cross-checking. Check logs and SWL logs are appreciated. Thank you . . . EZ9OAB, KC4OV, OK2BJU, OK2KVI, OZ4ZU, OZ5MJ, RA9OHV, SM6FKF, SP2EFU, SP6DMI, UA1OBQ, UA1QCM, UA1ZCZ, UA1ZEC, UA3EAL, UA3ET, UA3GO, UA3PAV, UA4FDD, UA4HBP, UA4HLX, UA4YAT, UA6AQJ, UB5EF, UK9AEC, UQ2GBR, UQ2MU, UW3BX, W1PM, Y24SL, Y24ZH, Y25TO, Y31PA, Y32ON, Y41ZM, Y47YM, Y48ZF, Y67XL.

STATION OPERATORS

MULTI-OPERATOR, SINGLE TRANSMITTER

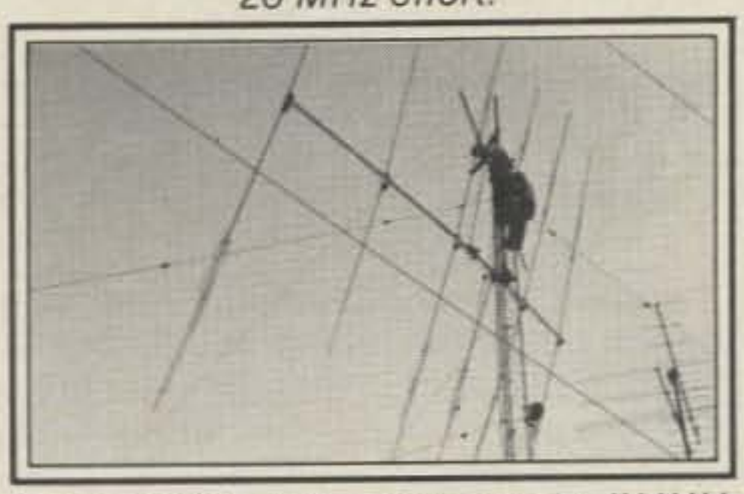
N4WW & KB4BU, N4SA, NE4F. **KN5H** & K5GN, K5KG. **N5JJ** & N5CDO, WB5WHR. **K2BA/4** & N8II, W4FOA. **KK5I** & K5JZN, K7CW, WA4PPX. **K3WX:** WA3UXU, WB3JRU. **AC8W** & K8DD, K8JLB, KJ8A, WA8MEC. **K0RWL** & K0TLM, K0UAA, KB0G, W0JU, W0VWW, WA0ZHY, WB0LFY. **AB2E** & N2CQ, W2KI. **K9MFI** & WB9JKI. **N9AAP** & K9CT, WB9MSV, WB9YSP, WD9EPG. **KB8SX** & KA8AKL, WB8JSQ. **AA4M** & KC4B. **WB6SHL** & N6DFY. **K8HV** & WD8MOV. **AK9N** & N9AUZ, WD9DBC. **G4AAQ/KR8** & N8BJQ. **N1EE** & K1PR. **WD8JJA** & KA8JCI. **VE1DXA:** VE1AVX, VE1BSE, VE1CER, VE1FH, VE1MX, AA2Z. **VE5DX** & VE4RM, VE4VV, VE5RG. **VE3PCA:** VE2ZP, VE3CRG, VE3CXL, VE3KKB. **VE7CNY** & VE7CMK, VE7FFI. **KL7IB** & KL7DM, NL7J, NL7K, NL7P. **VE7ZZZ:** VE7EMX, VE7ENF, VE7ENI, VE7SK, VE7VX, VE2EUB/7. **4K1A:** UA3XBP/4K1, ALEX, SERGE. **JA9YBA:** JA9LJI, JA9LNJ, JA9LWB, JA9OTX, JH0CAZ. **JA7YAA:** JR7OMD, JR7SEI. **JA3YKC:** JA3ODC, JF3PMM, JR3FRR, JR4BSM. **8J5SUN:** JA5BJC, JA5EGX, JH5ESM. **JA4YFH:** JF3GPS, JH4DIT, JH4FMI, JH4MVB, JR4TKR. **JA7YCQ:** JI1FLB, JH7FZI, JH7UGG, JR7NTP, JH0CZQ, JH0PJZ. **JA2YKA:** JG1GIF, JJ1BTA, JE2RQT, JH2QXG, JR2GMC, JH6RPZ, JA9NFO. **JA0YAK:** 8 Ops. **JA7YRR:** JA7CLN, JA7CXV, JA7FDY, JA7MQM, JA7OZW. **JA7YAF:** JE7EWB, JR7HMS, JR7GGO, JR7QWW. **JA3YQD:** JE2HOI, JE3EPK, JF3PLF, JR3GWH. **JA9YAV:** JA9SQO, JA9SOT, JA9VWC, JA9VXM. **HG6V:** 6 Ops. **OH0BH:** OH1MA, OH2BH, OH2KI. **4U6ITU:** F6DCQ, F8RU, HB9AFI. **G6UW:** G3CWI, G3XTT, G4BUO, G4FAM, G3ZAY, SUSAN. **4N0RA:** YU1DW, YU1OPI. **DK0OI:** DJ3WM, DJ3XD, DJ7MG, DK1II, DK5HH, DK6BO. **Y39ZO:** Y39UO, Y39XO. **G4DSE** & G3RZI, G3XVR, G4GXL. **OH3AA:** OH3IQ, OH3KS, OH3WS, OH3XS. **OH1AF:** OH1BC, OH1EH, OH1HS, OH1KA. **HA5KKC/7:** 6 Ops. **TF3IRA:** TF3CW, TF3YH. **GW4BRS:** GW3BVJ, GW3DZE. **OH5AD:** OH2IC, OH5LK. **HA7KPL:** HA7PL & 5 Ops. **HA1KZZ:** HA1XU, HA1ZI, HA1ZN, HA1ZZ & 2 Ops. **OK3KEE:** OK3CGG, OK3CTL, OK3TKA. **OZ5EDR:** OZ3QN, OZ8AE. **OH2AC:** OH2BSH, OH2BSJ, OH2BTI, OH2BVI. **OK2KWI:** Club Gp. **OZ1BII** & OZ1EQC. **HA5KFN:** 6 Ops. **HB9BLQ** & HB9ALM. **OK1KRQ:** OK1DLF, OK1IVJ, OK1-19973. **HA4KYH:** HA4XG, HA4XX, HA4YK, HA4YQ, HA4-001. **OH9UW** & OH9PH, OH9VE, OH9VM. **YU5FBE:** Club Gp. **LZ2KSQ:** 2 Ops. **DF0AJ/p:** Gp. **HA8KAK:** 3 Ops. **HA1KSL:** 3 Ops. **OK3KAP:** OK3TPV & Club Gp. **OH6AS:** OH6DO, OH6FG, OH6QR. **LA4O:** LA1PBA, LA6ZH, LA9HW. **HA2KMR:** 4 Ops. **YO6KEI:** YO6AWR, YO6UX. **GM3USL:** GM3DJS, GM3JOB, GM3XNE, GM4LLY. **LZ1KEZ:** 3 Ops. **HA5KDB:** 6 Ops. OK2KWU & OK2JK + Club. **HA9KPE:** HA9RH + 1 Op. **HA3KNA:** HA3NS + 1 Op. **OK2KYC:** Club Gp. **OK3KGQ:** Club Gp. **OH8LB** & OH7WZ. **OK3KJF:** OK3CDR & Club Gp. **SP3PFR:** SP3MGP, SP3MGZ. **OK1KYS:** OK1DEY, OK1FRF. **HA2KMG:** 2 Ops. **SP1KRU:** Club Gp. **YU1ANO:** YU1OWW, YU1OZS, YU1QJA, YU1RA. **OK1KTW:** OK1ADV & Club Gp. **OK1KPX:** OK1AMD & Club Gp. **LZ2KRR:** LZ2AF, LZ2OV. **OK1KMP:** Club Gp. **SP7KTE:** SP7AW, SP7IFM. **KH3AB** & KH3AA. **UK9OAC:** UA9OBG, UA9OEK, UA9OFE, UA9OFH. **UK8MAA:** 3 Ops. **UK7GAA:** UL7GDH, UL7-01899, UL7-018136. **UK7BAL:** 3 Ops. **UK0FAD:** UA0FAY, UA9-154126, UA0-153217, UA0-153216. **UK0LAH:** UA0ZBP, UA0ZCL, UA0ZDD. **UK9FER:** UA9FAL, UA9FAR, UA9FDA, UA9FDW, UA9FGO. **UK0SAB:** UA0SLU, UA0-124103, UA0-124504. **UK0AMM:** UA0AAA, UA0ACQ. **UK0KAG:** UA6ABS, UA0KBC, UA0-139153. **UK8AAI:** UI8ACI, UI8CY. **UK0KAB:** UA0IZ, UA4-13321/UA0. **UK9ADS:** 3 Ops. **UK9OBO:** UA9OCK, UA9PP, UA9-145805. **UK9CES:** 3 Ops. **UK0LAA:** Club Gp. **UK6FAB:** 3 Ops. **UK2PCR:** UP2BBT, UP2BCR, UP2BCT, UP2BDF, UP2BFL, UP2BFN, UP2BIO, UP2PCI, UP2-038728. **UK2PAP:** UP2OX, UP2-0381634, UP2-0381635, UP2-0381636. **UK5MAF:** UY5LK, UB5MDC, UB5MNM, UB5MNX, UB5MNY, UB5MOA, RB5MUV. **UK2PRC:** UP2BBM, UP2BIL. **UK5YAA:** 3 Ops. **UK4WAB:** 4 Ops. **UK1AAU:** 3 Ops. **UK2BCC:** UP2BDW, UP2BHK, UP2BJK, UP2-038346, UP2-0381728. **UK3AAR:** UV3GT, UW3GC, UA3AJU, UA3AHE, UA3ALQ, UA3AVO. **UK2BCO:** UP2-0381049, UP2-0381050. **UK5AAO:** UB5AAL, UB5ADN, UB5AEK. **UK3TAN:** UA3-1221009, UA3-1221011, UA3-1221010, UA3-1221142. **UK6ACR:** UA6AUW, UA6AXC, UA6-10136. **UK3XAM:** UA3XBY, UA3XCQ. **UK6WAW:** 3 Ops. **UK5UBE:** UB5UGG, UB5-0658831, UB5-065963. **UK1ZAS:** 3 Ops. **UK1AAF:** UA1AGL, UA1ALG, UA1-169185. **UK5UDX:** UB5UAL, UB5XCM, UB5-065734. **UK3RAD:** 3 Ops. **Uk3DCF:** UK3DAC, UA3-14223, UA3-142829. **UK5IGL:** UK5IHN, RB5IYZ, UB5-073148. **UK2AAP:** 3 Ops. **UK3TBY:** 2 Ops. **UK5ZAC:** UB5ZFH, UB5-069305. **UK6AAY:** UA6AUZ, UW6DM.

MULTI-OPERATOR, MULTI-TRANSMITTER

YT0R: YU1OFJ, YU7ODO, YU7ODS, YU7OQI, YU7OQZ, YU7QBC, YU7QFX,YU7QDW. **KH6XX** & KH6LW, KH6ND, KH6NO, WH6ABM. **YO0A:** YO3AC, YO3FU, YO3JJ, YO3JW, YO3QK, YO4ATW, YO4AVR, YO4HW, YO4SI, YO4XF, YO8BAM, YO9AGM, YO9BQN. **K5IU/C6A** & KC4XR, N5RM. **AI6V** & AA4KB, K6MYP, N6AUV, N6TV, W6OAT, W6YKM, WB6SHD. **UK5IBB:** UB5IJK, UB5IMH, UB5IML, UB5IPP, UB5IOK, UB5-0733159. **HG1W:** 6 Ops. **JA3YBF:** JA9TAF, JA9TOZ, JE3OPD, JE3PAS, JE3PED, JF3KKO, JF3NXN, JF3PGA, JG3GKK, JG3IUG, JI3BPB, JI3KWZ, JH4CES, JH4IFF, JR4AGT, JH5BIT, JH5JKH. **W3GM** & K3FD, K3GM, K3OA. **HG5A:** 9 Ops. **JH1YDT:** JA9WNG, JA0VSH, JE1QMV, JF1EAL, JG1MIK, JG1XLZ, JH1GNU, JH6UUN, JH6VJZ, JH7TMM, JH0HKJ, JH0HNI, JI1QPU, JK1CQG, JK1DLQ, JK1FLU. **JA2YEF:** JA9QNC, JA9XDR, JA0UEX, JE2KIH, JE2LLR, JE2RDI, JE2RWP, JE2TUH, JE2UGT, JE2WBH, JE2WJB, JF2ACB, JF2ERH, JF2FZF, JF2KKL, JF2DDW, JF2NFC, JF2NTV, JF2WMP, JR2TWA, JR2TPD, JR2PVI, JR2UWZ, JF3EIT, JF3THB, JH4XKV, JH9CTW. **JA1YXP:** JA7WFS, JA0WGG, JE3UBC, JE6IGU, JF2DIB, JI1HDG. **K2UA** & N2ME. **JA6YDH:** JA3ONR, JR3XZV, JA4JYL, JE6ASN, JE6DSG, JE6LFQ, JG1TAW, JH6RAD, JH6SWF, N9BBD. **NN3SI:** K3KMO, WA3QWA, W4HU.

John, KH3AA, and Bill, KH3AB

G4GIR says he had "807 power" for his 28 MHz effort.



The new KLM beam going up at 4X4UH.

QRPer, Paul, OA8V, and his bodyguard, Arthur.

ZF2AH, alias WA6VNR. Joe's antenna and Cayman Islands site is pictured on the cover of the January '82 CQ.

TROPHY WINNERS

SINGLE OPERATOR - ALL BAND

WORLD - Canadian DX Assn. Trophy. Won by: **Station YT2D, Opr. Emil Z. Balen, YU2RA.**
U.S.A. - Corker A. Rhines, W8EOA Trophy (Charles Rhines, W7VIU Memorial). Won by: **Stuart R. Santelmann, KC1F.**
CANADA - Canadian Amateur Radio Federation Trophy. Won by: **John Sluymer, VE6OU.**
EUROPE - Sig. Jakobsson, TF3CW Trophy. Won by: **Algis Kregzde, UP2NK.**
JAPAN - Palm Garden Contest Club Trophy. Won by: **Toshio Kurosawa, JR1RNC.**
WORLD-QRPp - Nevada Amateur Radio Assn. Trophy (George Hewitt, WB7OOQ Memorial). Won by: **Station OA8V, Opr. Dave Marcelli, OA8LP.**

SINGLE OPERATOR - SINGLE BAND

WORLD - Pedro Piza, Jr., NP4A Trophy (Pedro Piza, Sr., KP4ES Memorial). Won by: **Jorge H. Bozzo, LU8DQ** (21 MHz).
U.S.A. - Kansas City DX Club Trophy. Won by: **David O. Hachadorian, K6LL/7** (21 MHz).
SOUTH AMERICA - John Kroll, K8LJG Trophy. Won by: **J. Robert St. Germain, OA4AWD** (7 MHz).

MULTI-OPERATOR SINGLE TRANSMITTER

WORLD - Ron Blake, N4KE Trophy. Won by: **Club Station UK2PCR, Oprs. UP2BBT, UP2BCR, UP2BCT, UP2BDF, UP2BFL, UP2BFN, UP2BIO, UP2PCI, UP2-038728.**
CANADA - Tehrahedral Contest Circle Trophy. Won by: **Station VE5DX, Oprs. VE4RM, VE4VV, VE5RG, VE5DX.**
EUROPE - Jonas Bjarnason, TF3JB Trophy. Won by: **Club Station HG6V,** 6 Operators.

MULTI-OPERATOR MULTI-TRANSMITTER

WORLD - North Florida DX Assn. Trophy. Won by: **Club Station YT0R, Oprs. YU1OFJ, YU7ODO, YU7ODS, YU7OQI, YU7OQZ, YU7QBC, YU7QFX, YU7QDW.**

CONTEST EXPEDITION

WORLD - Northern Ohio DX Assn. Trophy. Won by: **Station OH0BH, Oprs. OH1MA, OH2BH, OH2KI.**

CLUB COMPETITION (S.S.B. & C.W.)

WORLD - Canadian DX Assn. Trophy. Won by: **YU DX Club** (Yugoslavia).
U.S.A. - Northern Ohio Amateur Radio Society Trophy. Won by: **Frankford Radio Club.**
SPECIAL CQ AWARD - Won by: **Arik Beitcher, 4X6NDE/QRPp.**

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CIRCLE 108 ON READER SERVICE CARD

Here's a helpful hint for your workshop that's simple to do, and it definitely will improve your project-to-soldering-iron-tip ratio.

How To Stretch The Life Span Of Soldering Iron Tips

BY BYRON H. KRETZMAN*, W2JTP

My workbench usually has two soldering irons "cooking," one a 30-watt "pencil" iron for fine work, and the other a 100-watt American Beauty (40 years old) for heavier requirements. The small iron seemed to burn out every few months, perhaps because the line voltage is normally about 125 volts. And the frequent cleaning required of the tip of the larger iron was getting to be a pain.

One duplex outlet on the front of the workbench, just under the overhanging bench top, was used for the irons, which kept the line cords off most of the workbench top.

I thought of putting in resistors and switches to lower the voltage on the irons when not in immediate use, but I discarded this idea as too complicated. Then I remembered that somewhere I had seen the suggestion of putting a silicon diode rectifier in series with the irons. The idea was that the irons would then receive only half-cycles of the 60 Hz sine wave, thereby reducing the heating approximately by half. A quick try confirmed the practicality of this procedure. Now, how to make use of this idea in the most simple manner? With just a little thought a really simple arrangement of two outlet boxes, one above the other, would do it, the bottom outlets with the diode in series with one leg.

Now either one or both irons can be kept on "standby" by plugging them into the lower outlets. When a reasonably busy period is expected, the required iron is simply unplugged from the lower outlets and plugged into the upper outlets. Already warm, it then takes only a short while for the iron to come up to full temperature. The beauty of this scheme is that I can tell at a glance whether an iron is on standby or on full heat.

Fig. 1(a) shows the two "gem" outlet boxes mounted one above the other. A flexible line cord, with a grounding wire, then plugs into a convenient outlet elsewhere above the workbench. Note that the duplex outlets in the upper box are of the grounding type, while those in the lower box are of the ordinary two-prong receptacle type. The reason is that occasionally a frequency counter or other device is most conveniently plugged into the upper outlets. The silicon diode is rated at 400 PIV and 1 Ampere (Radio Shack #276–1103). It is mounted on an insulated standoff on the bottom of the box.

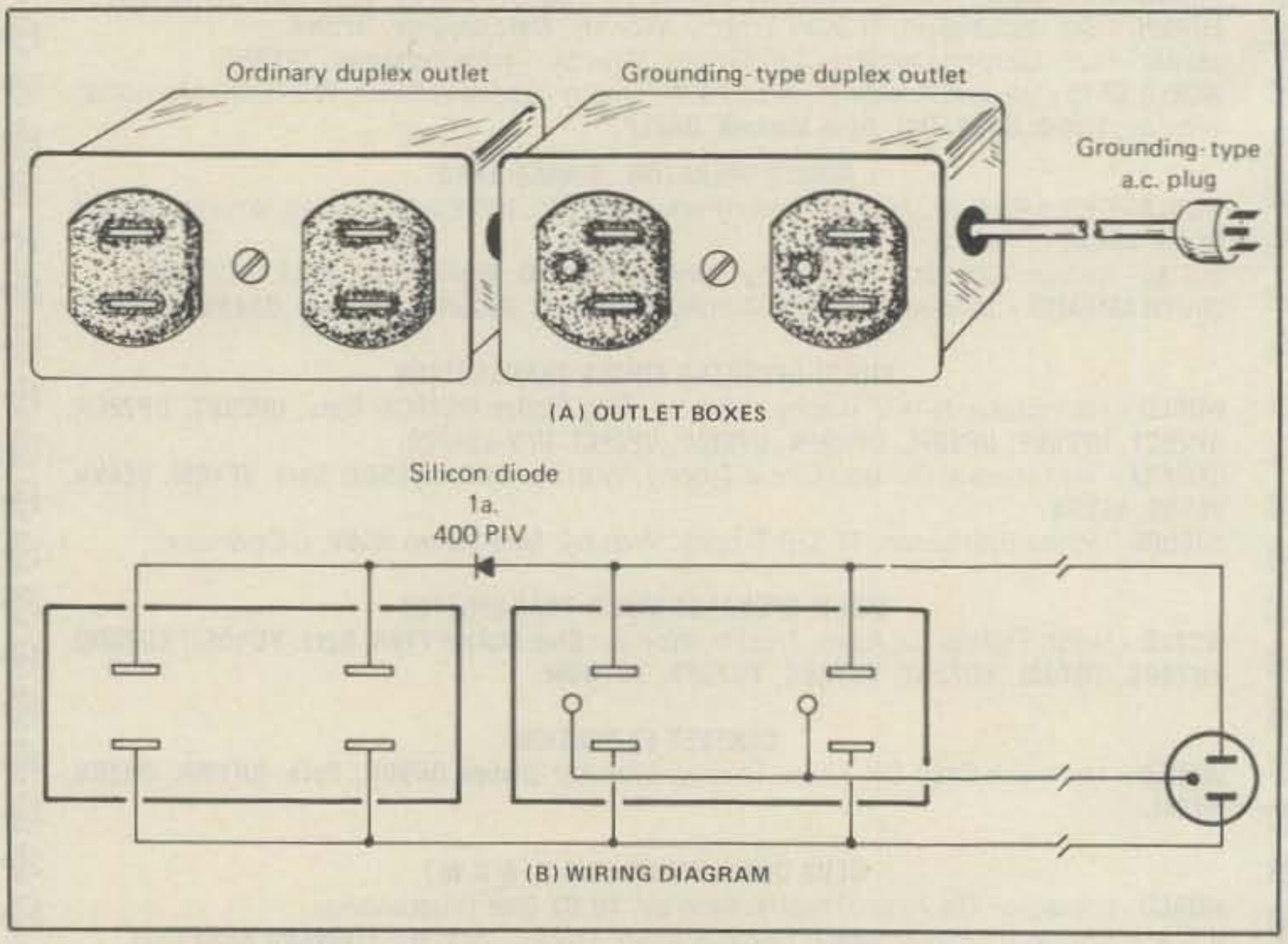

Fig. 1– (A) The outlet boxes. (B) Wiring diagram.

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The 2KD-5 We have been suggesting that you look inside any amplifier before you buy it. We hope that you will. If you "lift the lid" on a 2KD-5 you will see only the highest quality, heavy duty components and careful workmanship...attributes that promise a long life of continous operation in any mode at full legal power. The 2KD-5 is a 2000 watt PEP input (1200 watt PEP nominal output) RF linear amplifier, covering the 80, 40, 20, and 15 meter amateur bands. It operates with two Eimac 3-500Z glass envelope triodes and a Pi-L plate circuit with a rotary silver plated tank coil. Price $945.

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CIRCLE 31 ON READER SERVICE CARD

There is no need to concern yourself with when to ID when you build and use this simple timer.

A SIMPLE ID TIMER

BY ED SOLOV*, K2SE

Remembering to ID during a ragchew, or overdoing the ID routine, will never be a problem when you have this inexpensive ID timer at hand. Turn it on, and every eight or nine minutes it will sound a short note, reminding you that you are nearing the time to ID. With any kind of junkbox at all, you should be able to build it for under five bucks, not including a cabinet. With a little ingenuity, you should be able to put the whole thing in the old transistor radio case, using the speaker from it as well.

Circuit

The circuit uses two garden-variety 555 IC's, available at any Radio Shack for 99¢ each. The first, U1, provides the timing function, while the second, U2, is used as an audio oscillator. With the values shown, the output of U1, which appears at pin 3, is high for about eight minutes. This keeps pin 1 of U2, normally the ground pin, high, and prevents U2 from operating. After about eight minutes, pin 3 of U1 drops low for about one or two seconds. This effectively grounds pin 1 of U2, allowing U2 to oscillate and feed a tone into the speaker. After the one or two seconds are up, pin 3 of U1 goes high again, turning U2 off and stopping the tone. Eight minutes later the whole thing repeats.

If the momentary contact switch, S2, is closed, it shorts out the 1 megohm pot, effectively ending the wait for the tone. This allows the circuit to be reset and tested at any time. Since the first waiting period is longer than the eight minutes, I always close S2 immediately after turning my ID timer on, thus assuring that the eight-minute wait will result in a tone.

*247 Andover Drive, Wayne, NJ 07470

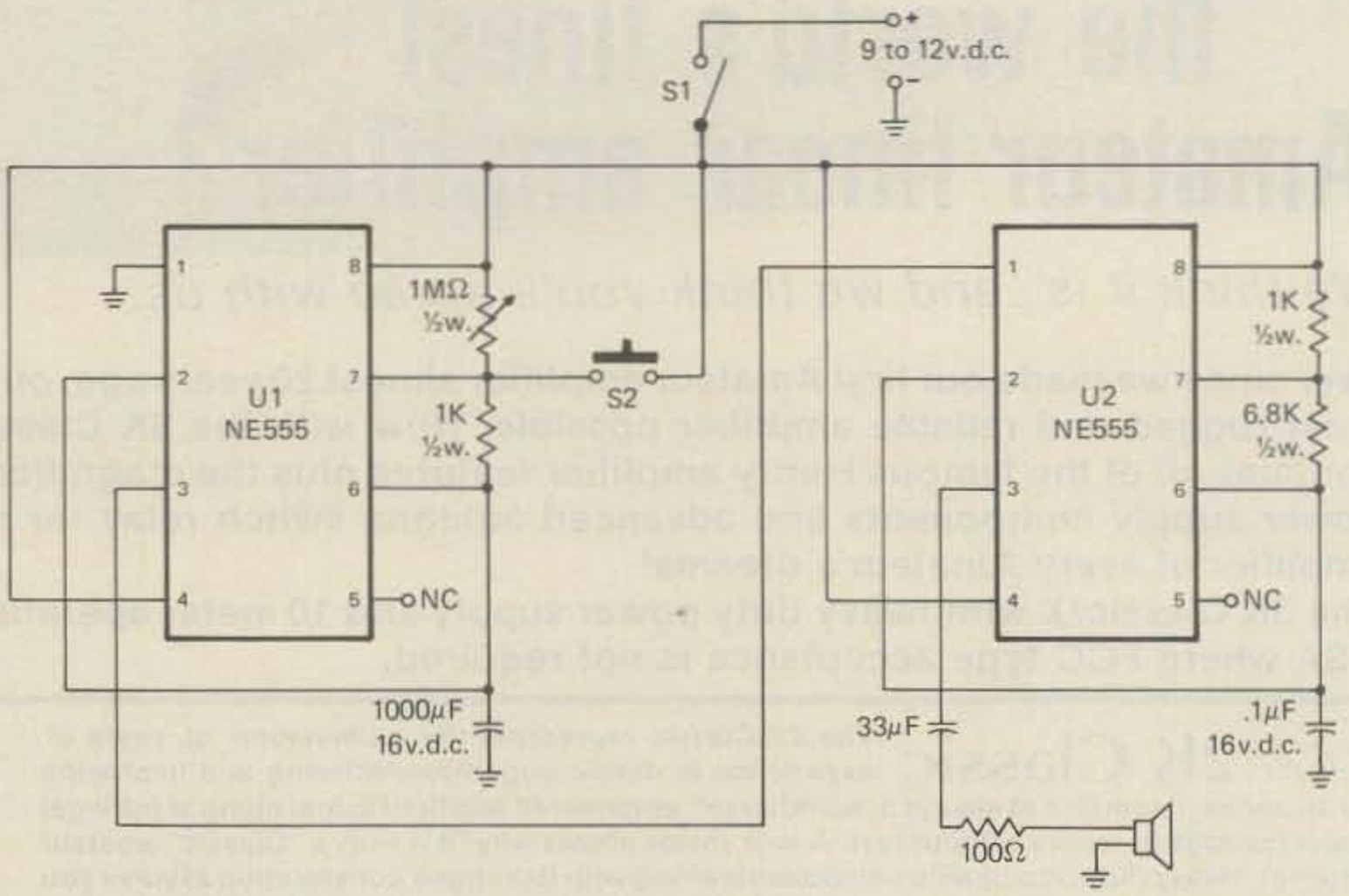

Fig. 1– The schematic diagram for the simple ID timer. All components are readily available.

The pot can be replaced by a fixed resistor. I used a pot so that I could adjust the waiting time between tones, but a fixed value of about 700 K (such as a 470 K in series with a 270 K) would do just as well.

Power can be supplied by a 9 volt transistor radio battery. I used one for awhile, but later decided to connect my ID timer to the 12 volt bus in my shack. No discernible difference in operation resulted.

Construction

I built my timer on a small piece of perfboard which I mounted inside a small cabinet. One possibility would be to mount it inside a speaker enclosure or a station console. Another thought would be to feed the output of the U2 IC into the final audio stage of the station receiver, through a small (.05 or .01) capacitor, thereby avoiding the need for an enclosure as well as a speaker.

Conclusion

I no longer ID too much during ragchews, nor do I concern myself about forgetting to ID. Now if I could only come up with some way to remember to turn on the ID timer. . . . ▣

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The TR7A and R7A offer performance and versatility for those who demand the ultimate!

TR7A Transceiver

• **CONTINUOUS FREQUENCY COVERAGE** — 1.5 to 30 MHz full receive coverage. The optional AUX7 provides 0 to 1.5 MHz receive plus transmit coverage of 1.8 to 30 MHz, for future Amateur bands, MARS, Embassy, Government or Commercial frequencies (proper authorization required).

• **Full Passband Tuning (PBT)** enhances use of high rejection 8-pole crystal filters.

New! **Both 2.3 kHz ssb and 500 Hz cw crystal filters, and 9 kHz a-m selectivity are standard,** plus provisions for two additional filters. These 8-pole crystal filters in conjunction with careful mechanical/electrical design result in realizable ultimate rejection in excess of 100 dB.

New! **The very effective NB7 Noise Blanker is now standard.**

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New! **Mic audio available** on rear panel to facilitate phone patch connection.

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• **Full passband tuning (PBT).**

New! **NB7A Noise Blanker supplied as standard.**

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CIRCLE 107 ON READER SERVICE CARD

In an article written exclusively for CQ Magazine UV3GM tells us what amateur radio is like in the USSR.

Amateur Radio In The USSR

BY V. B. GROMOV*, UV3GM

There are 31,000 amateur radio stations in the USSR today, with close to 60 per-cent of these having UA, UB, etc., prefixes. These are h.f. operators who are obliged to pass a Morse code exam. The others are so-called v.h.f. stations having RA, RB, etc., prefixes, but it would be more proper to call them "phone class" because they can operate on all of the v.h.f. bands (144 MHz and above) plus 160 and 10 meters. Nearly 1,500 amateurs are using the EZ prefix. These are newcomers allowed to operate Top Band (160 meters) only. One can get an EZ license in this country at the age of 14, and any other license at 16.

About 4,000 Soviet stations have the UK prefix. These are club stations where hams as well as s.w.l.'s can operate. So, all in all, there are about 100,000 amateur radio operators in our country. One should bear in mind, however, that amateur radio in the USSR is but one kind of radiosport, the others being fox hunting (hidden transmitter hunts), indoor telegraphy, and amateur radio all-around tournaments. The number of radio sportsmen in the USSR amounts to 500,000, but, judging by the demand for our *Radio* magazine the monthly circulation of which is close to a million copies, the number of those interested in radiosport is well above the half-million mark.

Amateur radio in our country is managed by the Radio Sports Federation (RSF) of the USSR. It's a public organization consisting of the Presidium and a number of volunteer committees. There are Short Wave Advisory Committees, committees for VHF and satellite communications, fox hunting, amateur certificates, radiosport referees, and several others. Each union republic and region of the USSR has its own federation which is bound to involve local amateurs.

The RSF relies in its work on the Krenkel Central Radio Club (CRC). *CQ* readers are familiar with just one of the CRC tasks—QSLing and issuing certificates. The address of the QSL bureau for the CRC is P.O. Box 88, Moscow, USSR and it should be well known to a great many American amateurs. The CRC is also responsible for many other things such as training various USSR radiosport teams, arranging amateur radio exhibitions, and issuing information bulletins. RSF and CRC have sponsored a number of certificates; most popular of them are P-100-0 (Worked 100 Regions of the USSR), P-15-P (Worked All 15 Union Republics of the USSR), P-10-P (Worked Ten Call Areas of the USSR), P-150-C (Worked 150 Countries), P-6-K (Worked Six Continents), RAEM, W-100-U, and others.

Each big city in the USSR has its own local radio club, and to get an amateur license one must be a member of such a club. The examinations in electronics, operating, and Morse code are taken by volunteer commissions formed by local federations. Amateur licenses are issued by local departments of the Mininstry of Communications.

Soviet amateurs are allowed to use all frequency bands assigned to the Amateur Service in ITU Region 1, including the 1850–1950 kHz segment of the 160 meter band. Yet on 80 meter we are only assigned a 3500–3650 kHz segment which seriously deteriorates our DX and contest operating, since the only practical way usually is to go split.

These days the most privileged band here is 15 meters and only the first class stations can use it. In the near future this situation is going to change. The new Amateur Rules to be introduced shortly specify that all h.f. stations (UA, UB, etc.) will be allowed to operate c.w. and s.s.b. on 160, 80, 40, 15, and 10 meters. Twenty will then become a privileged band where phone operation will be allowed to first class stations only.

Annually we have about ten big national events: contests and championships on short wave and v.h.f., Field Day, Meteor Scatter Activity, and a great number of local h.f. and v.h.f. contests. All such contests usually last for eight hours or less, with some 2,000 to 3,000 hams participating whose main purpose is to upgrade or qualify for certain sports ratings. The most experienced sportsmen strive for the title of USSR Short Wave Communications Champion (separately for c.w. and Phone) or V.H.F. Champ.

The second weekend of each May the RSF and CRC conduct the CQ-M DX Contest, the motto of which is "Peace to the World." It offers foreign participants a good chance to contact rare USSR territories and complete some of our amateur certificates.

Soviet hams also love to operate in other DX contests, and the most popualr no doubt are the *CQ* World Wide and WPX Contests. Several Soviet clubs went on DXpeditions during these contests recently and achieved really high scores. Just remember R6F (UK5MAA and UK5MAF), RG6G (UK2BAS), or EM6A (UK3ADZ and UK6APA). Our Short Wave Advisory Committee, in the course of determining the ten best USSR Stations Of The Year, encourages good results in *CQ* contests by crediting Soviet participants who score in the top twenty high National points towards our award. Of course Soviet amateurs must also score highly in USSR Championships. Unfortunately, SWAC sometimes has little or no chance to take the *CQ* contests into account. For the last couple of years our Central Radio Club has received neither results nor rules of CQ Contests. For this reason our official DX-bulletin *NLD* ("On amateur bands"), printed in the *Sovetsky Patriot* newspaper and edited by B. Stepanov, UW3AX, cannot inform Soviet amateurs

*Vice President, Moscow Radio Sports Federation, CRC, P.O. Box 88, Moscow, USSR.

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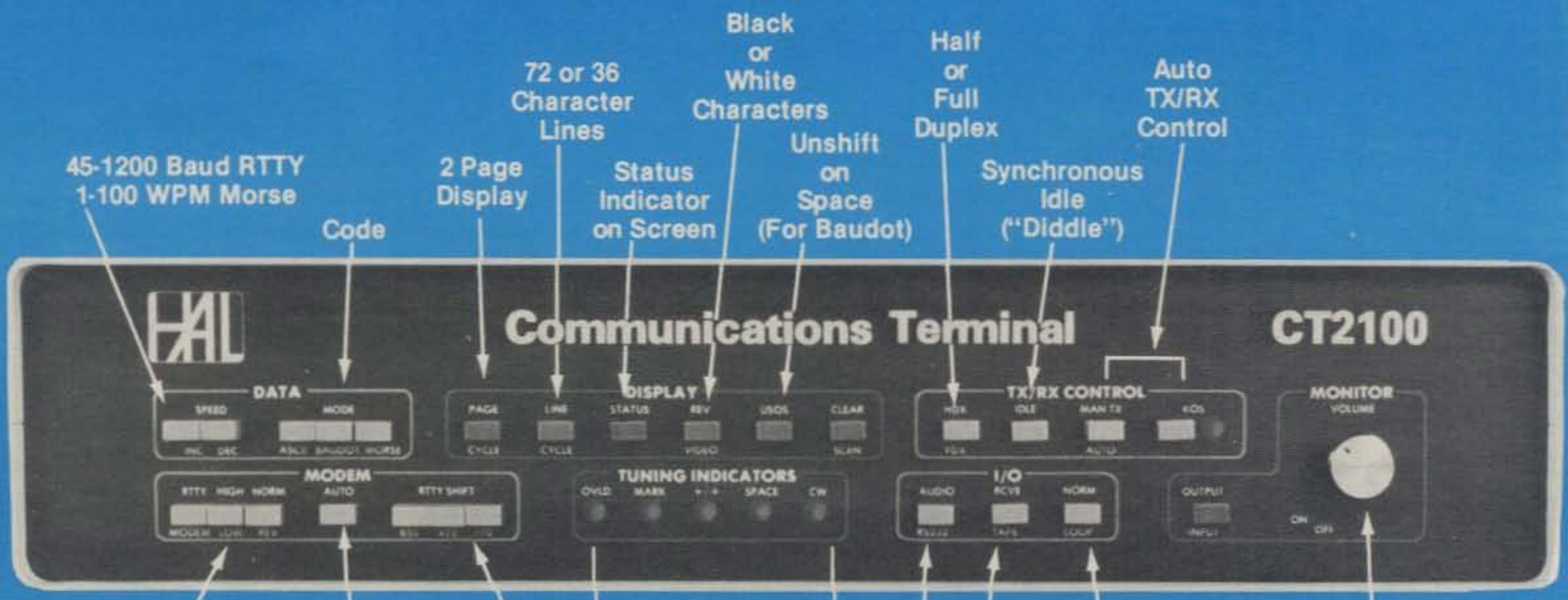

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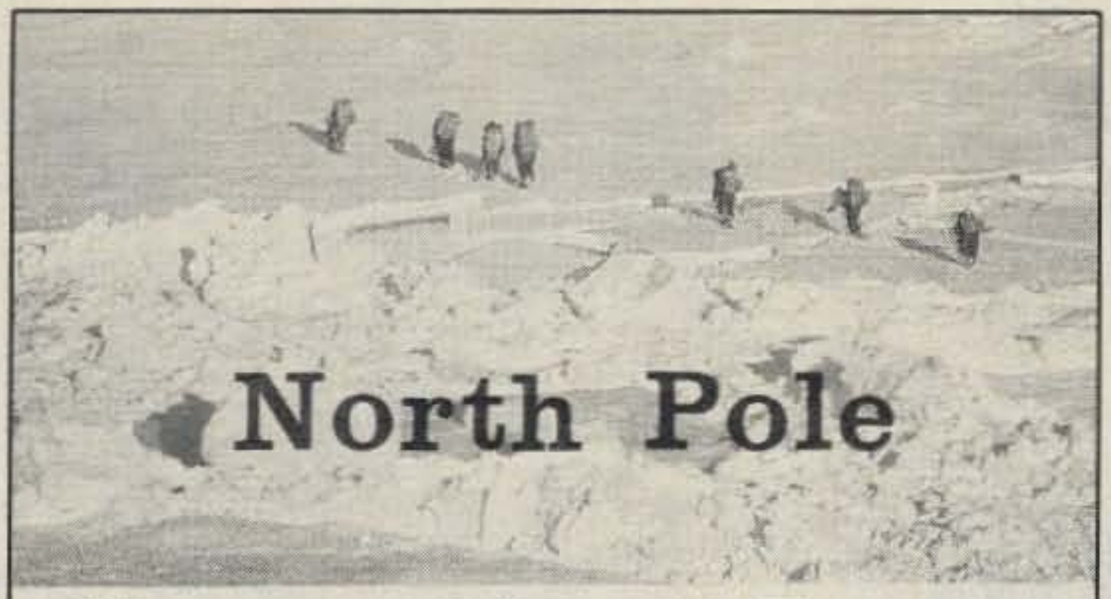
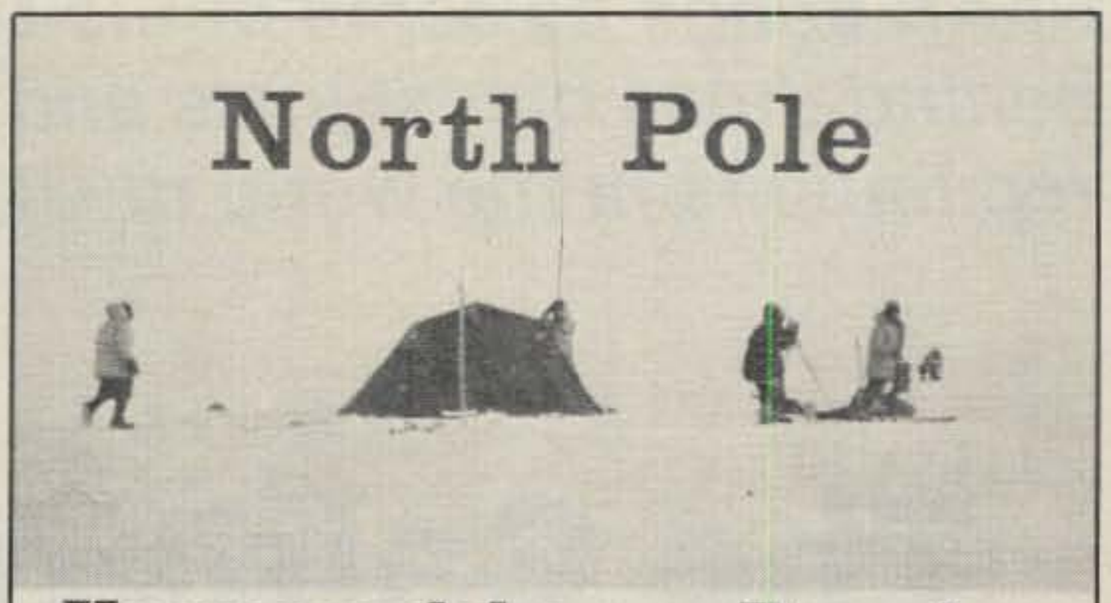




Famous Soviet North Pole DXpedition QSL cards.

in time about the coming *CQ* Contests and rule changes, if any.[1]

The most wide-spread transceiver over here today is the one designed by Yuri Kudryavtsev, UW3DI. It features a 6.0–6.5 MHz first i.f. and a 500 kHz electro-mechanical filter, and is rather simple to construct and adjust. One can easily buy all the major components required for the UW3DI transceiver, such as crystals or mechanical filters.

Leading Soviet club stations usually have three to five operating positions equipped with transceivers and one common automated power amplifier, which has separate pre-tuned output pi-tanks for each band. Having such a PA, the club station can easily transmit on one band while copying on the others. This sometimes makes an impression of "multi-multi" operation, although it is actually "multi-single" in the sense that only one signal is present on the air at any particular moment. In the *CQ* World Wide Contest, it's the "ten minute rule" that prevents our club stations from using all their operating capabilities.

But it is antennas, not transceivers, where our club stations outperform most individual hams. Many of the clubs now have a five to seven element Yagi on twenty, and quite often three to four elements on forty. Naturally, a ham living in a big apartment house hardly has a chance to set up such a huge antenna, but that is a universal problem. And yet some of our hams, like UM8MAO, have 100 foot towers in their yards.

One of the latest technical achievements of Soviet radio amateurs was the launching of six Soviet amateur "Radio" satellites in December 1981. I believe, some of you readers may have already made some QSOs in Mode A (144 to 28 MHz) through the space repeaters having one of the call signs from RS3 to RS8. Aboard two of them there are "robots" which are capable of answering one's call, so that now one can make a real "earth-to-space" QSO.

Soviet hams take an active part in providing communications for arctic scientific and tourist expeditions. In 1980, when seven Soviet skiers reached the North Pole, there was U0K operating from there. In the spring of 1981 many American and Soviet radio sportsmen had an opportunity to contact the YL ski expedition which signed YL0B, EK1P, and YL1P, the latter from Franz-Josef Land. Incidentally, from now on Soviet floating bases in Arctica will cease to sign UPOL on the amateur bands and will use the 40K prefix, 4K0A being the "North Pole-25" base.

Many Soviet hams are involved in certificate hunting, and a vast majority of them do have the certificates of local radio sports federations. We also have many good DXers. There are now 20 5BDXCC awards received in the USSR; the first two to get them were UR2AO and UW9AF. The author, who hopefully is still remembered for his 80 meter activity as UA0FGM in 1973–75, was the first in the USSR to receive the USA-CA-1000. I remember with pleasure the hours spent on the County-Hunters Net, 14.336, and my friends ever ready to give me a hand; Ken, K6BWD/W5VPV, Dave, W6CCM, Dick, W2BLM, Charlie, W1LQQ. My sincere thanks to Bill, W7GHT and Dick, K5VYT for my last counties in WA and NM, to Mel, W5AWT for confirmations from more than 50 counties, and to many others who helped me to contact more than 1,600 USA counties.

I have never mentioned the first moonbounce QSOs of UK2BAS, special anniversary operations, QSO parties, and hamfests. Nevertheless, I hope that *CQ* readers found in this article something new about amateur radio in the USSR.

See you all on the bands! 73

---

[1]*Admittedly there has been some difficulty in exchanging contest information with CRC over the past few years, but in actuality Soviet participation has been as heavy if not heavier judging by their logs for this same time period. We are mutually working on having all 1982 rules circulated in sufficient time for the Contest, as well as distribution of contest results.*

N6AR brings us some of the faces behind those big signals and big reputations in the world of DXing.

The California DX Convention

BY LARRY BROCKMAN*, N6AR

Two former DXpedition operators are shown here comparing notes: Don Jones, N6ZV (left) of D68, FR7/T, 3B8, 3B9, and 3D6 fame, and Jim Sullivan of KC6YC and KC6ZR.

The very first CQ WW DX Contest Chairman was this gentleman, Herb Becker, W6QD.

The Southern California DX Club and the Northern California DX Club have taken turns sponsoring the California International DX Convention in the Spring of each year for 32 years now. The event has drawn about 500 active DXers and contesters in recent years, with particularly heavy representation from the big name West Coast crowd. Recent DXpeditioners are on hand with slide presentations, there is a DX forum, usually involving an ARRL representative, a Contest Forum, and a lively Saturday afternoon cocktail party that just has to be experienced to be believed.

We have put together some photographs of the 1981 convention to give you an idea of the spectrum of participation. Presentations were made by Dave Gardner, K6LPL, on his several trips; Lloyd and Iris Colvin of YASME; and some of the real old timers, including the first CQ WW DX Contest Chairman, Herb Becker, W6QD.

This year's convention was sponsored by the Southern California DX Club, and was held at the Holiday Inn, Visalia, California, on Saturday, April 17 and Sunday, April 18, 1982. While the program is still being formulated at this writing, arrangements have already been made for a featured presentation by Dr. Vince Thompson, K5VT, on his recent trips to S9, TN8, 3V8, and others. Other top DX personalities tentatively planning to attend are Fernando, EA8AK (who is planning that ZA trip) and Marti Laine, OH2BH.

The ARRL's rep for the 1981 convention was DXCC mentor Don Search, W3AZD, shown here at the Saturday afternoon cocktail party.

Lars, SM0GMG, a very active DXer and Contester from SM land, has attended the convention 2 out of the last 3 years.

Marty Laine, OH2BH, operator of various DXpeditions in the past, including Albania, Mt. Athos, South Sudan, and Annobon Island, has attended the convention several times, and reportedly will be back this year. Marty is shown here with his XYL Lena, OH2BE.

Southwestern Division Director Jay Holliday, W6EJJ, and one of the really big 5 band guns, W6YA mull over the state of the DX bands.

*7164 Rock Ridge Terrace, Canoga Park, CA 91307

Say You Saw It In CQ

7Z2AP has attended several of the past conventions. Al always has a potent signal here in the Western reaches.

Every convention has its "Black Sheep." For DXers, it's the guy who shows up at the convention after calling CQ on 14.205 every morning. The "Black Sheep" put in this appearance at the 1981 convention. Bob Thompson, K6SSJ (left) and Al, WB3GPR are shown looking on. Bob has served as convention chairman for the NCDXC nearly every year the NCDXC runs the show.

Tom Schiller, N6BT, is shown here leading the DX forum.

"Cass," WA6AUD, CQ's DX editor and former editor of the WCDXB is shown here with Jim, W6OGC, and Charlie, W5DV, who published the popular paperback anthology of Cass's many years of WCDXB lore, entitled "DX Is." That's a book that all true blue DXers know well!

The heart of the YASME crew, Lloyd, W6KG, and Iris, W6QL, Colvin (left to right), talk things over with Laslow, WB6ILN.

David Schoen, N2KK (left) discusses those 80 meter openings to W land from far off J20, 8Q7, 4S7, and ST land with some of the faithful, including Dave, N7RK (center).

Al, WB8ZJW, of DX-to-DX net fame (left) made the trip to Visalia in 1981 and found Bahri, DJ0UJ (of TA2BK) a fascinating source of DX lore.

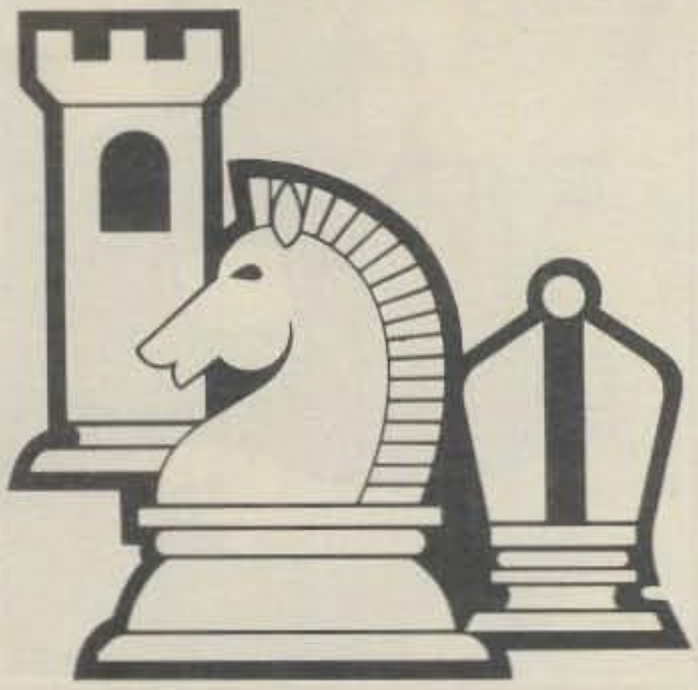
One of the big signals out of Arizona, Larry Pace, N7DD, sips a cup of coffee at the Saturday banquet. Larry has won USA high single op all band and single band honors in the CQ WW Contest in recent years.

Jim Stevenson, KM6B, (left) a perennial contender of the USA 15 M single band CQ WW Phone high is shown here talking over SCDXC board business with fellow officer Steve Orland, AA6AA (right). Yep, that's the same AA6AA that took the no. 1 USA 5B WAZ. Steve also holds 10 single band/single mode WAZ certificates, and still finds time to be DX at 3B8, D68, and FR0/T! Wow!

Bill Poelmitz, K1MM, whose credentials include 1S, VK9ZR, 5Z4, FR0, FO0, and H44 was another popular figure at the '81 convention.

Will Bobby Fischer, Anatoly Karpov, or Victor Korchnoi send you a QSL card after a chess game? Not likely, but Mike Sakarias, KL7KE, certainly will.

Chess and Amateur Radio



BY VINCE LUCIANI*, K2VJ

Are you interested in playing chess, nationally or internationally, via amateur radio? Would you care to join an organization of chess aficionados—those who seek to blend both hobbies?

"CARS"—Chess and Amateur Radio Society (tentative name)—is poised on the brink of development, and all that it needs to come into being is your participation. Its first breath of life came about in a rather unusual way.

The October issue of *Chess Life* carried an item I had written about my book, *Amateur Radio, Super Hobby!*, a letter which, while stressing the application of the book as a non-technical introduction to the hobby, also made clear the potential for a wedding between these two hobbies of chess and amateur radio, of being able to permit members to indulge in live, across-the-country matches, and all at no cost for phone or postage expenses.

Hoping to elicit book sales, I was surprised by the extent and variety of responses. Readers of *Chess Life* wanted to know more about amateur radio, about organizations serving chess and amateur radio, and about my book. These responses were received not only from those who are not radio amateurs, but also from those who were studying to be licensed and those who are already licensed; they ran the complete range.

From personal experiences (not only my own as mentioned in the book, but also those of my son, Jim, WA2JNN, who once spent an entire summer pursuing chess by amateur radio) I knew there was no national organization serving chess and amateur radio. I have since learned that there are organized local groups, and to bring everyone together will be one aim of CARS.

I submitted a second letter to *Chess Life* in which I pointed out the interests of their readers, those who wish to combine both hobbies. I included much the same information as is given below for the benefit of those who are licensed amateur radio operators and want to indulge in chess over the air, and for those who are

*P.O. Box 682, Cologne, NJ 08213-0682

(Left) Chess aficionado Mike Sakarias, KL7KE, was one of the first to respond to the author's letter in Chess Life. *Mike's situation is special. Located in the Eskimo village of Goodnews Bay, Alaska, chess by amateur radio is especially appealing to Mike. Eventually, after a few missed schedules due to the Christmas and New Year holidays and breakdowns to the village's diesel generator, plus changing band conditions, Mike and Jim Luciani, WA2JNN, conducted their first chess game. Sked for the game started on 20 meter c.w., dropped down to 15 c.w., and was finally concluded on 10 meter s.s.b. It sometimes takes perseverance. (Right) Jim Luciani, WA2JNN, avid chess player and DXer, in QSO with KL7KE for their first chess game on 10 meters.*

Say You Saw It In CQ

The remote Eskimo village of Goodnews Bay, Alaska, where chess by amateur radio has its obvious benefits. Between the mountain ranges and the village is frozen-over Goodnews Bay, which leads to the Bering Sea. Although average temperatures up there may have been lower, South Jersey switched roles one week after the WA2JNN/KL7KE match. It was a record 9 degrees below zero in early January, several degrees colder than in Goodnews Bay.

chess players who want to become licensed amateur radio operators (and, too, those who are neither but wish to become both).

1. Send me an s.a.s.e. (stamped, self-addressed envelope). Give me time, perhaps a few months in which to assess matters, to evaluate the potential of a CARS. I will eventually respond to every s.a.s.e. with a decision as to this potential, and the extent of my personal commitment (for it will be time consuming).

2. Eventually, methods will be drafted so that there will be national chess calling frequencies and times in order to simplify the urge to challenge someone from across the country to a match—and more. With the help of a committee, procedures will be documented.

3. A newsletter will be published. This will not be free, of course, for it cannot be. I plan to serve as the focal point for all inputs, and to summarize and publish these ideas, perhaps monthly. (Several interesting developments are already reportable, such as my contacts with international chess organizations. There are misconceptions abroad of how amateur radio would serve chess, and these need to be cleared for the eventual accomplishment of international CARS.)

All of what is in the planning stage is critically dependent upon the interest of those who read this and upon their responses. There may, finally, exist what so many seem to want—a marriage of these two fabulous hobbies.

Even more, there well may result a subsequent influx of new members to amateur radio, for it is my conviction that one cannot be accomplished at chess without also having the inherent qualities and discipline to become a very good amateur radio operator.

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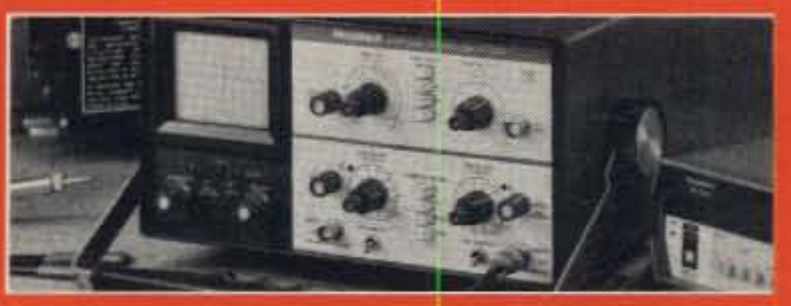

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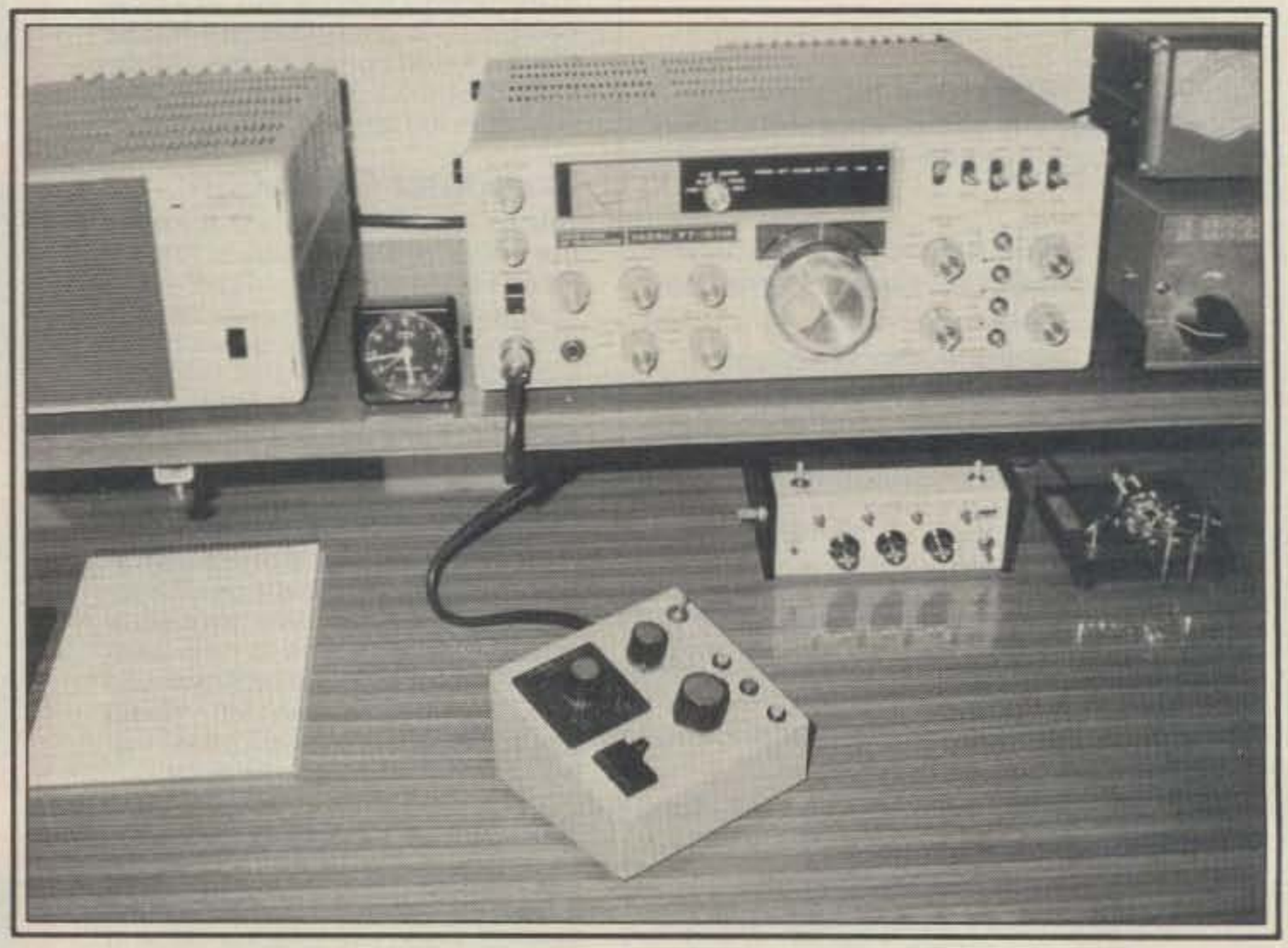
CQ Reviews:

THE YAESU FT-107M WITH DIGITAL MEMORY SHIFT

BY JOHN J. SCHULTZ*, W4FA

The FT-107M is a completely solid-state h.f. transceiver with a number of advanced features. However, my first impression of the unit had to do with its "styling" rather than with its technical features. "Styling" may seem like a strange word to use in relation to amateur equipment and hints of a Detroit-like product marketing snare. But, nonetheless, the FT-107M has a very pleasing appearance. Its off-white front panel combined with a medium brown enclosure, soft yellow digital frequency display, knobs just a shade darker than the front panel, brushed aluminum switches, etc., all combine to create a very harmonious design. In fact, it has proven to be one of the least eye fatiguing transceivers to operate over an extended period of time that I have ever used.



The FT-107M with the FP-107E power supply on the left. The small control box in the foreground basically duplicates the push-buttons found on the optional Yaesu YM-35 mobile scanning microphone so one can effect scanning operation in a home station situation using any microphone.

General

Setting aside the impression created by the appearance of the FT-107M, what does it really offer as a transceiver? First of all, the FT-107M is a complicated piece of equipment. Fig. 1, a block diagram of the stages in the FT-107M which will be discussed later, gives one just a glimpse of the complexity of the FT-107M circuitry. However, if one strips everything down to the basic essentials, the FT-107M turns out to be about the ultimate design of a single conversion h.f. transceiver using the 9 MHz i.f. principle. This approach to the design of an all-band h.f. transceiver has been well proven by many designs over the years from many manufacturers. It does not allow the easy inclusion of general coverage receiving capabilities as is the case with transceivers having a first i.f. in the v.h.f. range. However, just about every other feature known these days can be and is included in the FT-107M.

Table I lists the essential specifications for the FT-107M. It is a fully solid-state 6 band transceiver (160–10 meters) with provisions for two auxiliary bands and a 5 MHz WWV receive only capability (later model FT-107's, Serial No. 60001 and up, come with the new WARC bands factory installed). Each band is fully covered in 500 kHz segments and there is at least a 50 kHz overrange above and below each band. The input power rating is 240 watts on s.s.b. and c.w. and 80 watts on FSK and a.m. VOX is built-in as well as a true r.f. type speech processor. On receive, a variable i.f. bandwidth system is used which allows a continuous variation of the i.f. bandwidth from 300 to 2400 Hz. An active peak/notch audio filter variable from 300 to 1400 Hz is also included as well as RIT. Both digital and analog frequency readouts are available. The LED digital readout has six digits and is of a soft yellow color. The analog readout is performed by an inner dial with markings every 50 kHz and by a skirt dial on the tuning knob with markings every 1 kHz. Spacing between the 1 kHz markers is

*c/o CQ Magazine

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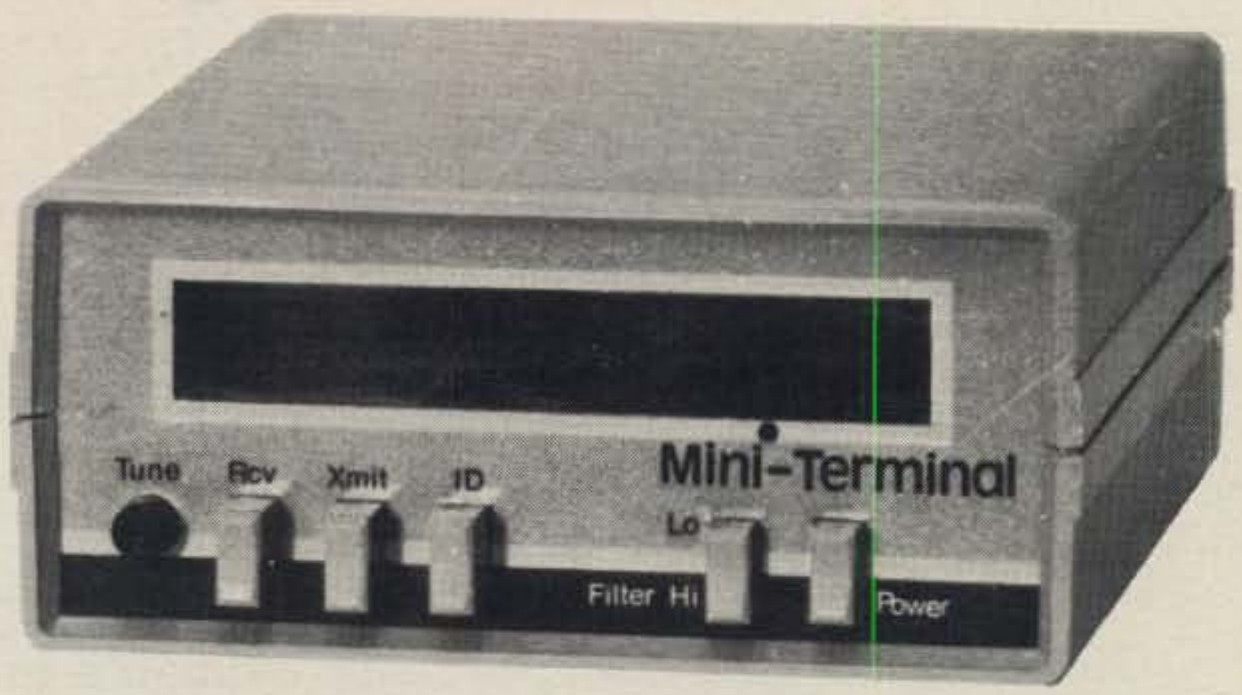

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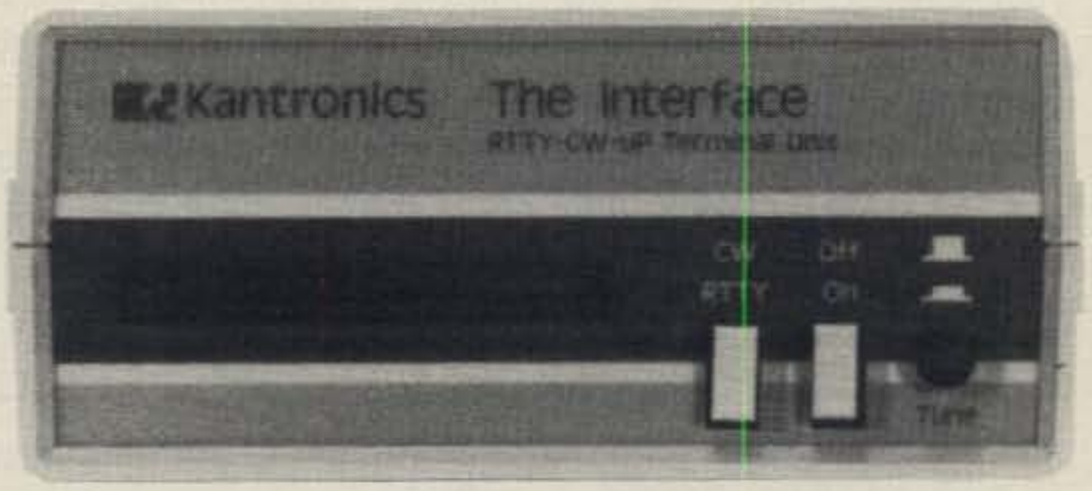

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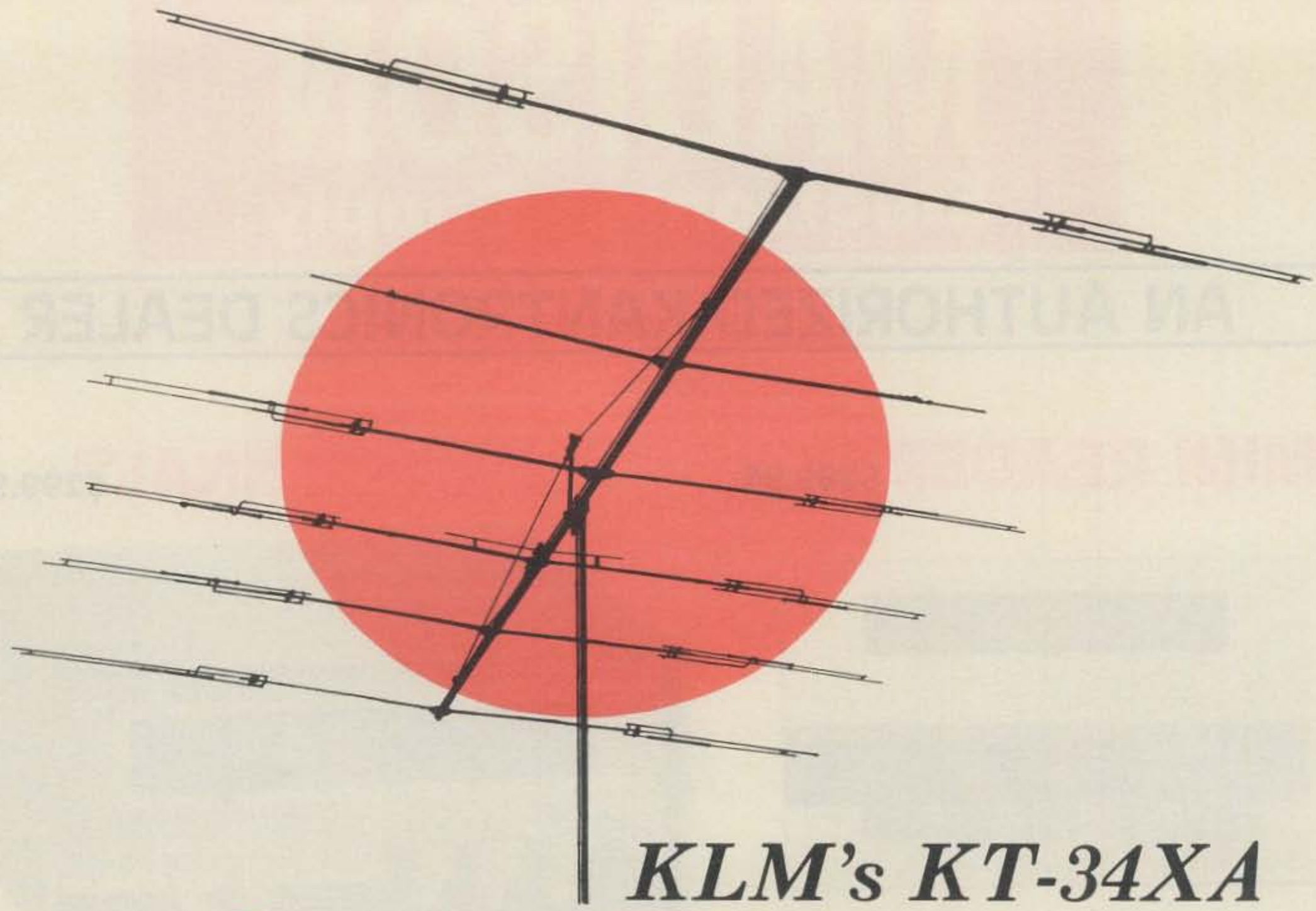

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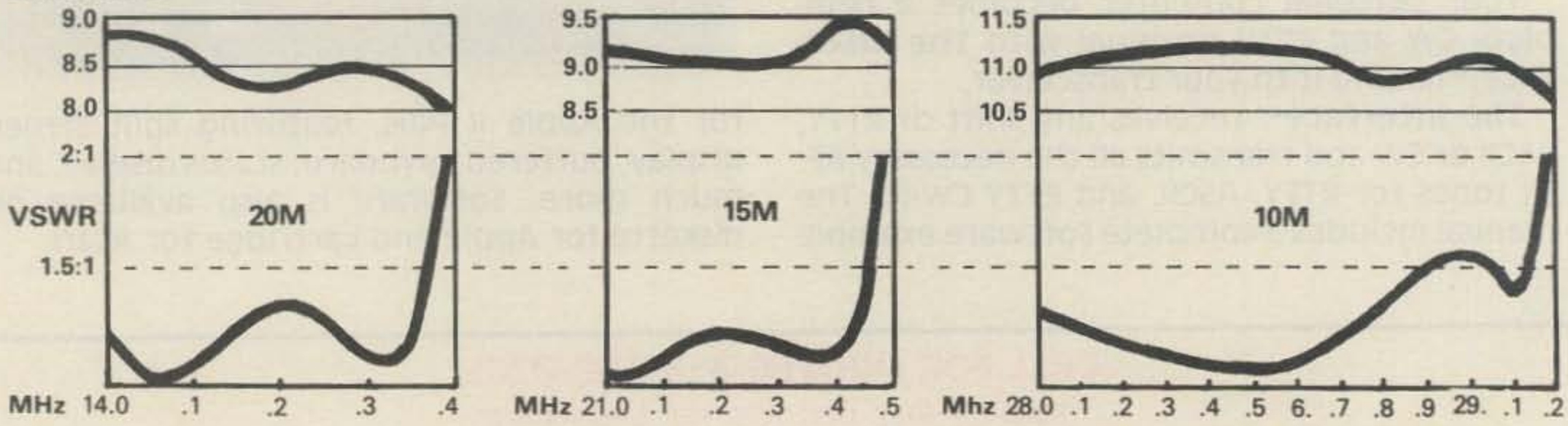
KLM's field proven KT-34A is the heart of the "XA" model. The boom length of the "XA", however, has been doubled, and one tri-resonant and one full size 10 meter element have been added. These changes increase the gain to **11-11.3 dBd** on 10M, **9-9.5 dBd** on 15M, and **8.5-9 dBd** on 20M. Two driven elements are used to make the KT-34XA unusually broadbanded (a concept applied to many KLM antennas). Gain is virtually flat across each band except for 10 meters which has been optimized for the DX'er, 28-29 MHz. The chart below shows the remarkable performance qualities of the KT-34XA.

KT-34XA GAIN vs. VSWR



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General

Frequency Coverage: Full coverage of 160–10 meters plus 5 MHz receive. Two auxiliary bands can be retrofitted; serial 06001 and up have WARC bands installed.

Modes: LSB, USB, CW, AM, and FSK (170 Hz shift).

Stability: Less than 100 Hz drift after 30 minute warmup.

Transmitter

Power Input: 240 watts DC on SSB, CW; 80 watts on AM, FSK. Variable from 0 watts up.

Power Output: Not specified but ¾ power still available at 1:3 load SWR.

Frequency Response: Shaped 350–2700 Hz (–6 dB points).

Carrier and Unwanted Sideband Suppression, Spurious Radiation: all 40–50 dB down.

IMD, 3rd Order: 31 dB down.

RF Speech Processor: RF clipper type, 6 dB average "talk power" gain.

Receiver

Sensitivity: 0.25 uV for 10 dB S/N all modes except AM (1.0 uV).

Dynamic Range: typical 90 dB, CW bandwidth, 20 kHz tone spacing.

Selectivity: 2.4 kHz/–6 dB to 4.0 kHz/–60 dB (SSB), variable 300 Hz to 2.4 kHz.

AF Notch/Peaking Filter: Variable 300 Hz to 1.4 kHz.

Image, IF Rejection: 50–70 dB, depending on band.

Audio Output: 3 watts, 10% THD, 4–16 ohm, built-in speaker.

Optional DMS Unit

Construction: plugs into internal space provided.

Frequency Memory Channels and Shift: 12; each shiftable ±500 kHz in 100 Hz steps.

Scanning: two speed, up/down when using scanning type microphone.

Physical/Power Requirements

Size/Weight: 334 × 129 × 400 mm (incl. heat sink); 12.5 kg.

Power: 13.5 volts ± 10%, 2 amp receive, 20 amp transmit (at max. input).

Table I– Summarized specifications for the FT-107.

generous and one can read down to a fraction of a kHz even from the analog dial. The frequency readout shows the true transmit or receive frequencies regardless of mode, RIT setting, etc., and the analog dial follows the same frequency rotation on each band. Tuning can, of course, be done by the main tuning dial or if one buys the optional DMS (Digital Memory Shift) unit, one can also tune the transceiver by means of scanner type push-buttons.

The FT-107M is truly a "no-tune" transceiver since there are no drive, peaking, or other adjustments necessary for either transmit or receive. Full metering is provided including output s.w.r., although one must go through the usual "forward set" procedure to set the meter and then switch it to read s.w.r. A nice touch on a transceiver of this class would have been a "computing" type s.w.r. meter. As can be seen from the physical size notes in Table I, the FT-107M is not a miniature transceiver. However, it can be a fully self-contained unit if one wants to use it for portable or mobile operation. It has a built-in speaker and an effective noise blanker. Also, two power supplies are available—one that can be inserted into the transceiver enclosure (FT-107M) or an external one which includes a better speaker (FP-107E). Both supplies can accommodate line voltages ranging from 100 to 234 v.a.c. Especially when one considers the convenience of the built-in supply, the FT-107M as a total portable package may still compare favorably as far as convenience is concerned to separate transceiver/power supply combinations.

Circuit Description

Referring to fig. 1, it might be interesting to follow through the basic circuitry of the transmit and receive chains and then later some comments will be made on actual measurements and results using the transceiver. The s.s.b. transmit chain is conventional with audio and carrier signal being fed to ring modulator D5003-D5006. The resultant 8.9875 MHz d.s.b. signal is then buffered and reaches the 2.4 kHz s.s.b. filter XF3002 and the following buffer stage Q3005. At this point, the s.s.b. signal can either go through the r.f. speech processor or bypass the processor. As mentioned before, the speech processor is a true r.f. type and is shown in fig. 2. When it is in use, the s.s.b. signal is routed through a variable gain FET input stage, Q6001; a symmetrical hard clipping IC amplifier, Q6002; another s.s.b. filter, XF6001; and a FET output amplifier stage, Q6003. The s.s.b. signal, processed or unprocessed, continues to a double balanced mixer stage, D1034-1037, which is the same mixer stage used for the receive input signal. At this point, the s.s.b. signal is translated to its output frequency and amplified by a series of stages up to the final power amplifier stage.

These stages are all broad-banded and so the final power amplifier stage is followed by a low-pass filter unit which switches in a separate low-pass filter for each band. The individual filters are switched in or out by an elaborate grouping of 12 relays which also provides for the grounding of the input and output of each filter which is not in use. The bandswitch in the FT-107M controls only d.c. voltages and all of the switching of r.f. filters, oscillator stages, etc., is done either by relays for high-level r.f. circuits or by diode switching for low-level r.f. circuits. The same is true for other switches in the FT-107M; they only control d.c. control voltages.

To digress for a moment, this probably accounts for the extremely smooth feel and operation of all the switches since quality switches could be used which do

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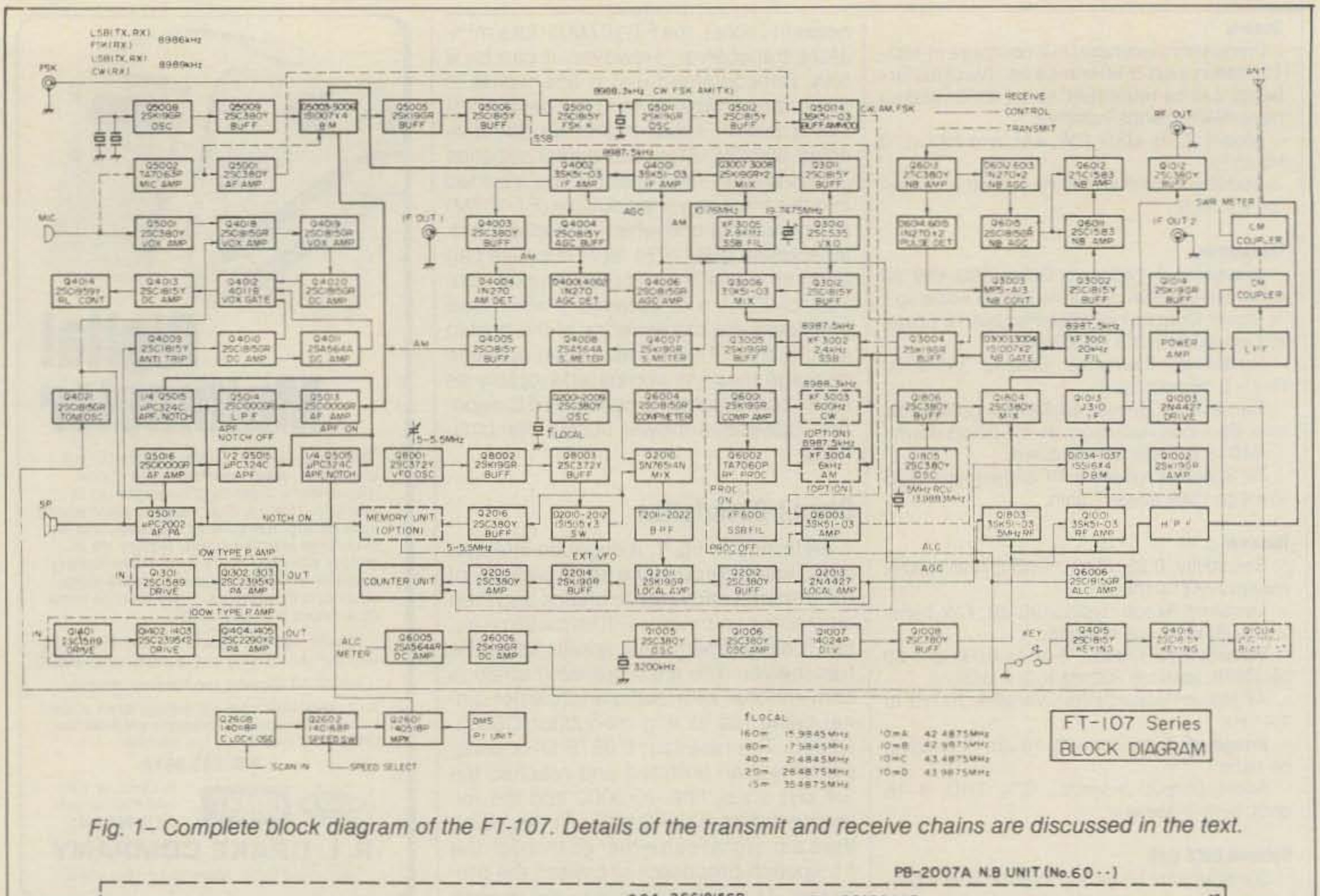

Fig. 1– Complete block diagram of the FT-107. Details of the transmit and receive chains are discussed in the text.

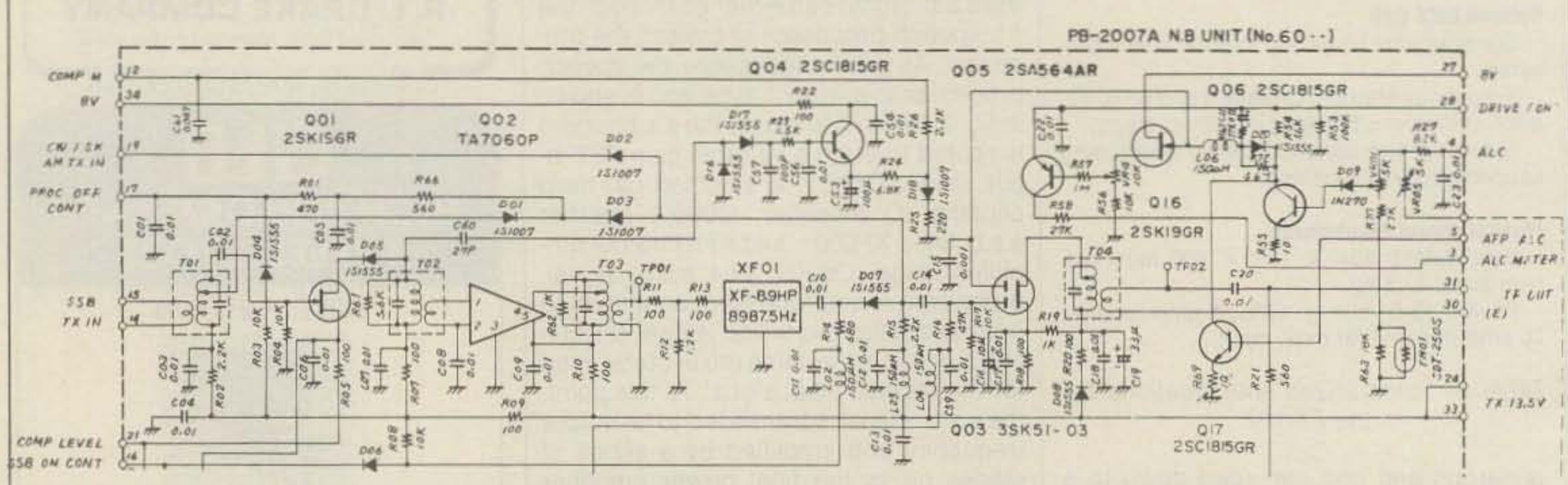

Fig. 2– The r.f. speech processor of the FT-107 is a straightforward, neatly executed design as explained in the text.

not have to directly switch any significant current. The only disadvantage to this approach is that various relays are activated even in the receive mode so a standby current drain of over 2 amperes is necessary.

After filtering, the r.f. signal is routed through two directional couplers, one being used for a.l.c. voltage generation and s.w.r. shut-down protection sensing, and the other for s.w.r. metering, and then to a relay for transmit/receive antenna transfer. A separate carrier oscillator on 8988.3 kHz, Q5011, is used in the c.w., FSK, and a.m. modes. On FSK the carrier oscillator signal is shifted 170 kHz when keyed and on a.m. the carrier signal is low level a.m. modulated in buffer stage Q5004. The rest of the signal path is the same as for s.s.b. In any mode, a carrier level control is effective which allows the input power to be varied continuously from zero to full input power. A conventional VOX circuit is used and a sidetone oscillator which is active on c.w. has part of its output routed to the VOX circuitry to allow for semi-break-in operation.

In the receive mode, the input is first routed through a lamp fuse and then to a fixed 1.7 MHz high-pass filter. Light coupling is then made into a fixed frequency 5 MHz crystal-controlled front-end for WWV reception. This separate front-end consists of the stages Q1803-Q1806 as shown in fig. 1. The main signal path is to r.f. amplifier stage Q1001, a dual-gate FET stage. This stage is quite elaborate and has diode switched bandpass networks inserted in its input and output for each band as shown in fig. 3. The signal then goes to the same double balanced mixer stage as used on transmit, D1034-D1037, for translation to the 8987.5 kHz i.f. frequency.

An i.f. buffer stage, Q1013, feeds the signal first into a broad 20 kHz i.f. filter, XF3001. This filter provides the necessary delay time for matching noise pulses to a blanking signal provided by the noise-blanker circuitry, Q6011, etc. The time constants in this circuitry are chosen to distinguish between very short duration, high amplitude noise pulses, and slower, amplitude varying input signals. The threshold level at which the blanker becomes effective is adjustable. After the buffer Q3004, the signal is routed through

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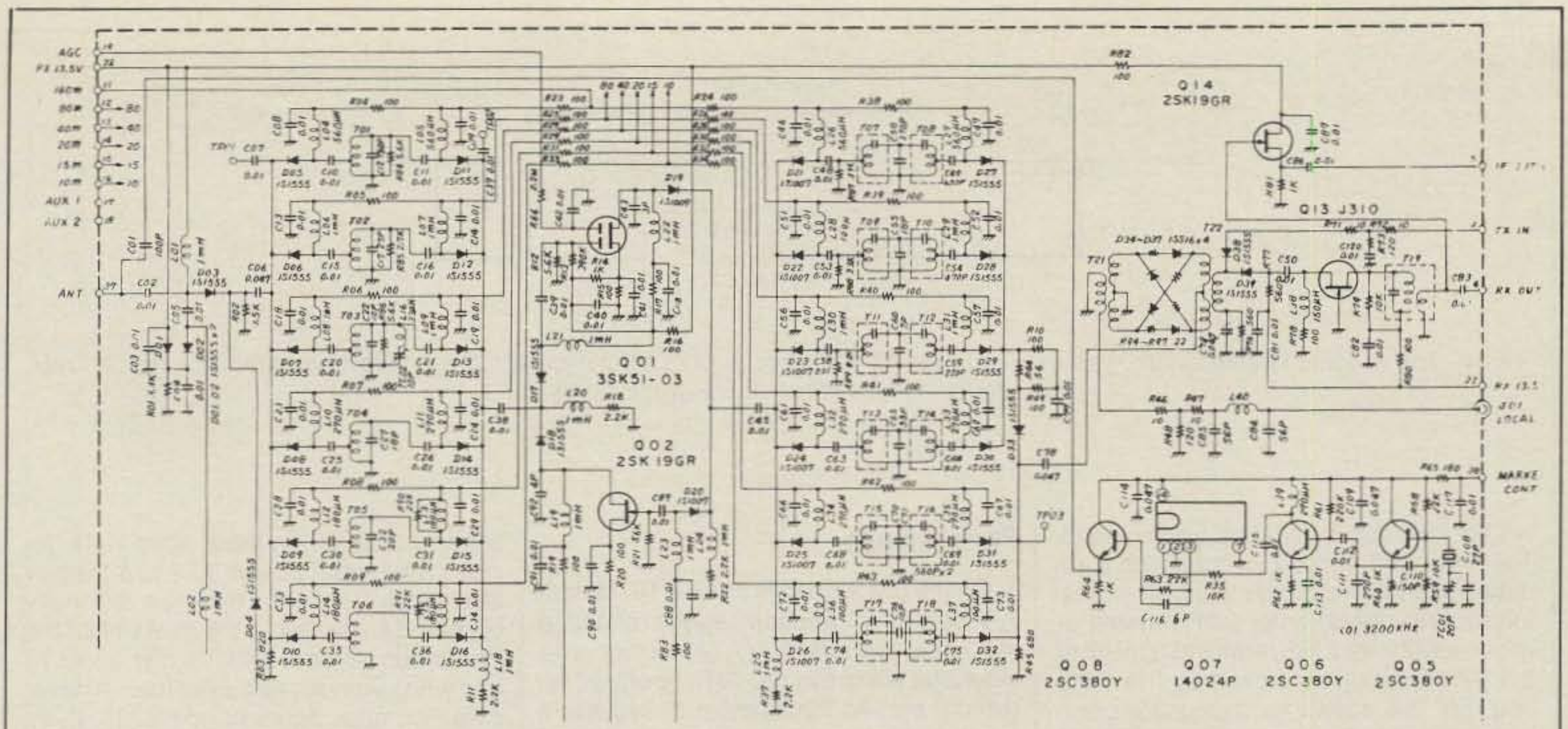


Fig. 3– The "front-end" of the receiver portion of any new transceiver is always of interest. The FT-107 uses a dual-gate MOSFET r.f. amplifier with diode-switched, tuned input and output circuits for each band. The mixer stage following the r.f. amplifier is a ring mixer type using Shottky diodes. The circuitry at the lower right is that of the 25 kHz marker oscillator which uses a divided-down 3200 kHz crystal oscillator.

the 2.4 kHz s.s.b. filter, XF3002, and then to the variable i.f. bandwidth circuitry. This circuitry, which consists of stages Q3006-Q3008, Q3010-Q3012, and s.s.b. filter XF3005, is one of the most interesting features of the FT-107M. It is clarified a bit more in fig. 4. Basically, it is a true i.f. bandwidth control system where the passband of one s.s.b. filter is moved across the passband of another s.s.b. filter without producing a change in the main i.f. frequency. The principle is not new but is neatly executed in the FT-107M. Of course, it is a very superior approach to that of simple i.f. notching or shifting filters.

Referring to fig. 4, the s.s.b. signal following the first s.s.b. filter is fed to mixer Q3006 which has an output at 10.76 MHz. This output passes through a fixed 2.8 kHz wide crystal filter at 10.76 MHz and then to mixer Q3007/3008 where the signal is translated back to 8987.5 kHz. A common oscillator at 19.7475 kHz feeds both mixers. If the oscillator frequency is left on its center frequency, the incoming signal is "framed" by the first 2.4 kHz s.s.b. filter. If the oscillator frequency is moved up or down from the center frequency, the "frame" of the 2.8 kHz s.s.b. filter moves across that of the 2.4 kHz filter in either an up or down frequency direction. The result is that the incoming signal is "framed" by the overlapping filter responses. In effect, a variable bandwidth of 300 to 2400 Hz is achieved. Since the output i.f frequency is not changed, a c.w. signal when it later goes to a product detector stage does not change in tone as long as it remains in the bandwidth set. S.s.b. signals act as though their high or low frequency content is being increasingly cut off depending upon whether the bandwidth control is varied in an up or down frequency direction.

The rest of the receiver chain is fairly conventional with additional i.f. amplification, detection in a balanced mixer (a separate diode detector is provided for a.m.), and audio amplification up to the 3 watt level. I.f. a.g.c. is provided with the front panel selection of "fast," "slow," or "off" options. The a.f. selection does include a fixed active 2.7 kHz low-pass filter and an active peak/notch filter which provides roughly for a selectable 20–30 dB peaking or notching of any frequency from 300 to 1400 Hz. Finally, a 3.2 MHz crystal oscillator, which has its frequency divided down, is used to supply 25 kHz markers so one can calibrate the analog frequency readout (the skirt on the main tuning knob can be rotated to line up its frequency markers when zero beat with the calibration signal is achieved by tuning the main tuning knob).

Common to both transmit and receive operation is the v.f.o. circuitry. It starts out with a conventional, variable 5–5.5 MHz v.f.o. oscillator, Q8001, feeding a mixer stage which then finally provides the correct injection signal to double balanced mixer, D1034-1037, which is active on both transmit and receive. The basic mixer stage between the v.f.o. and the balanced mixer is quite an elaborate affair with 9 separate crystal oscillators (one for each 500 kHz band segment to include full 10 meter coverage) and individual bandpass output filters for each band.

The DMS (**D**igital **M**emory **S**hift) option essentially takes the place of the 5–5.5 MHz v.f.o. when it is in use. The DMS circuitry includes a counter which always counts the v.f.o. frequency that is set. If desired, one can then enter the frequency into any one of 12 selectable memories. The DMS circuitry is that of a 5–5.5 MHz frequency synthesizer with the usual VCO and phase-locked loop referenced to an internal crystal oscillator. A programmable divider is controlled by a front panel memory shift control so any recalled frequency can be shifted up or down in frequency in 100 Hertz steps over the entire simulated v.f.o. range. The same action can be remotely controlled by push-buttons and some additional circuitry in the FT-107M, but not in the DMS unit, allows the push-buttons to also initiate a slow or fast speed up/down scanning action when using any memory channel. Besides the 100 Hertz step shift control, there is a memory fine tuning control which shifts any recalled memory frequency ±500 Hertz continuously. If a greater frequency shift is desired, the "clarifier" (RIT) control can also be brought into play with any recalled memory frequency although it is a standard feature and not part of the DMS option. It will shift the memory or v.f.o. frequency about ±4 kHz. Since the DMS unit in essence replaces the v.f.o. when it is used for frequency control, it doesn't matter how the memories are used. That is, they can store frequencies all in one band of interest or be split up among the bands as desired. However, the memories don't know for which band a frequency was stored. So, one has to note which memo-

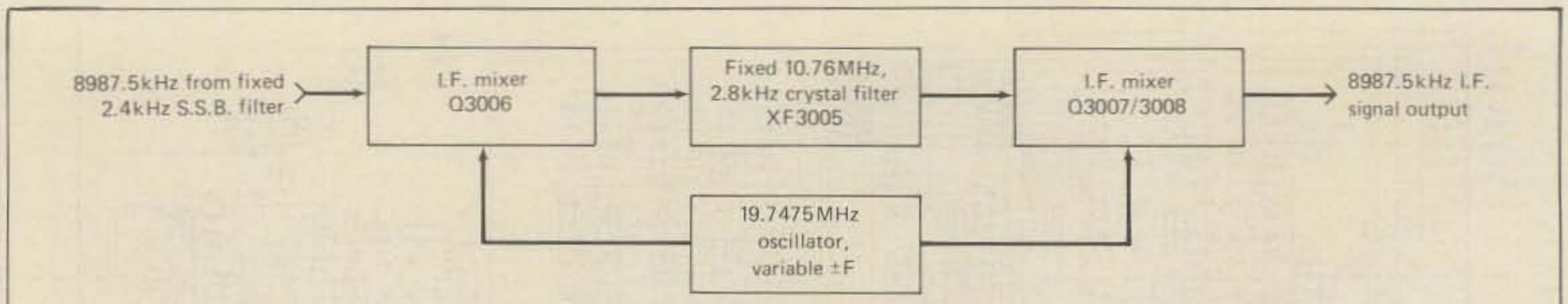


Fig. 4– The variable i.f. bandwidth system used in the FT-107. The 19.7475 MHz oscillator is a crystal controlled type that is "rubbered" a few kHz by a varactor diode.

ry channels one is using for a given band. The DMS unit can be switched so a recalled memory channel controls transmit/receive operation or just transmit or receive with the v.f.o. retaining control of the function not controlled by the DMS unit. So, this allows for transmit/receive frequency splits when desired up to the extreme ends of any band.

The 6 digit frequency counter provides resolution to 100 Hz. Basically, it counts the injection frequency supplied to the double balanced mixer used for frequency translation in both the receive and transmit modes. Internal presets are provided so the counter displays the correct carrier frequency for the mode of operation being used.

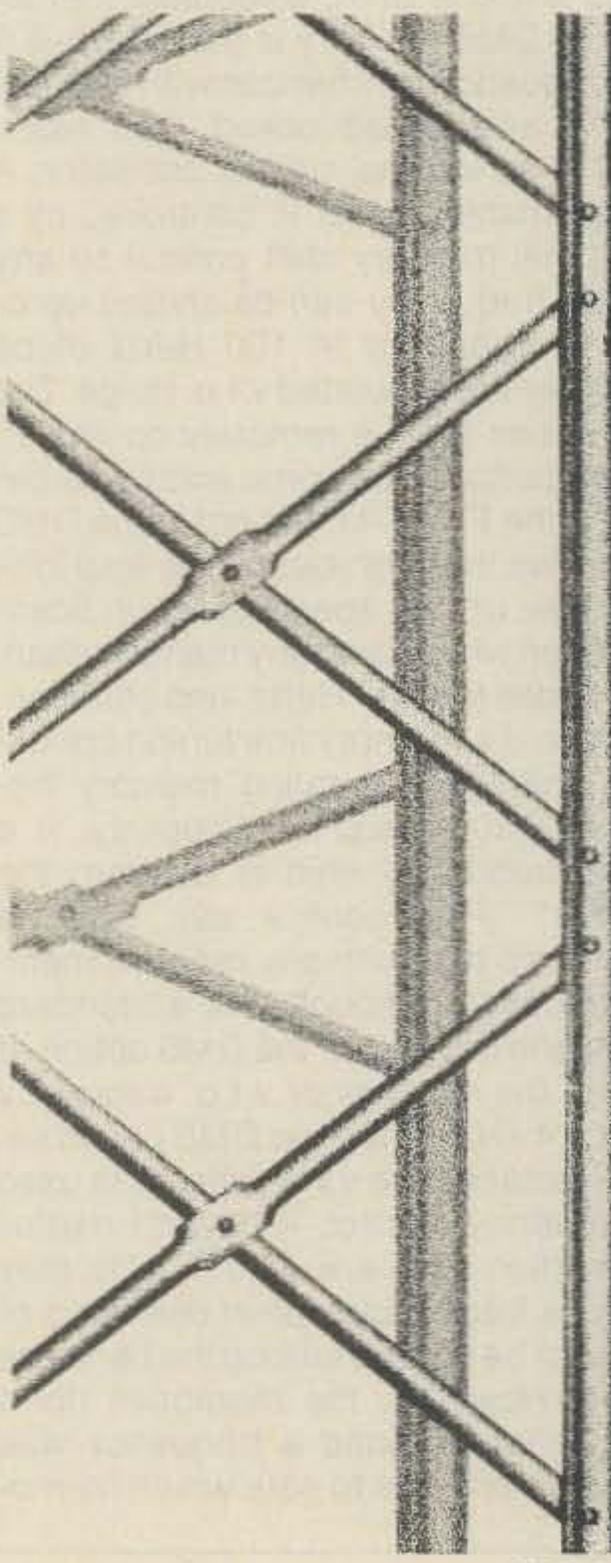
Performance

On the transmit side, the FT-107M easily meets all of its specifications related to the usual factors such as carrier and sideband suppression, IMD, spurious radiation, etc. An input power of 240 watts could be achieved on all bands. Yaesu doesn't quote a minimum output power and this was found to vary a bit—from almost 120 watts on 160 meters to slightly less than 90 watts on 10 meters. Such efficiency is acceptable but not spectacular. However, one must note that the FT-107M does have a greater tolerance towards s.w.r. than many solid-state rigs. About 70-75% of the output power was still available when the load s.w.r. was between 1:2 to 1:3. In many solid-state designs the output power falls to a third or less with a 1:3 s.w.r. There is a thermally operated fan built into the heat sink of the PA. In normal operation on c.w. or s.s.b. and when working into a flat load, it never came on after hours of operation. It did cycle on and off, however, when the FT-107M was worked into a mis-matched load. It was not tried on RTTY, but at its rated input of 80 watts for that mode, there is no reason to believe that the FT-107M couldn't remain "key-down" indefinitely.

Transmit operation is extremely simple since there are no tuning controls. For tune up purposes, one can set the mode switch to FSK, key the carrier, and use the drive control to vary the output power as desired. However, as simple as this sounds, it can be a bit tedious after doing it a few hundred times. As described later, there is a very simple external control box one can build to use the frequency scanning functions for home station use. I incorporated into this control box a simple RC sine-wave oscillator with a variable amplitude output which feeds an auxiliary microphone input.[1] A DPST switch on the output potentiometer switches the oscillator on and keys the PTT line. In this way, while tuning up an antenna coupler or linear, the mode switch on the FT-107M can be left in an s.s.b. position. The oscillator potentiometer needs only to be turned on and as the oscillator output is increased, the carrier level will increase for tuning purposes.

The r.f. speech processor proved to be extremely effective in operation. Various tests showed the use of the processor to add no noticeable distortion to the audio and usually an "S" unit or so increase in signal strength was reported. The most satisfying, however, was to receive unsolicited reports that the audio has "good punch" or sounds "very punchy and clear." The microphone used, by the way, is a D-104 with a preamplifier for im-

[1]A full discussion of this control box appeared in "Taking the Chore Out of Tuning Up," by Schultz, CQ, January 1982, p. 50.



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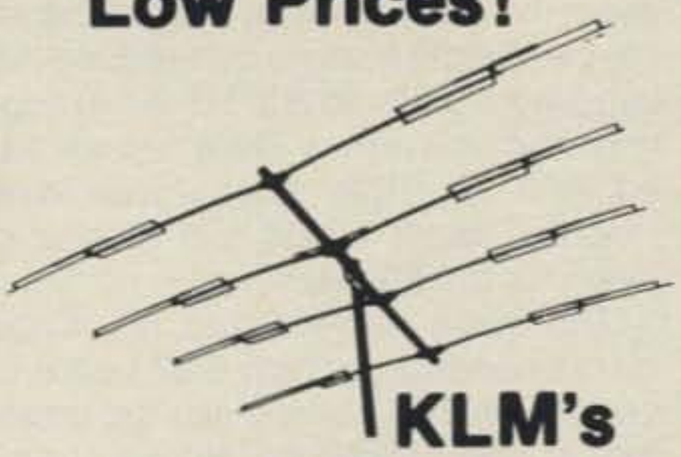

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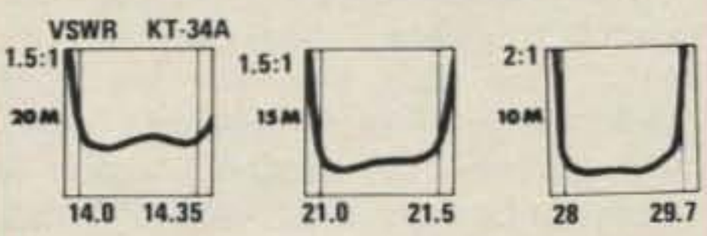

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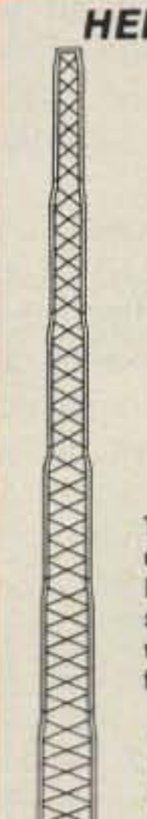

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pedance conversion into the low-impedance microphone input of the FT-107M. On c.w., the keying waveform appeared to be quite clean and sharp. Unfortunately, the VOX "delay" control is located on the back panel of the transceiver. So, when using semi-break-in by having the sidetone activate the VOX circuitry, it is a bit inconvenient to change the delay time to suit different keying speeds.

On the receive side, the FT-107M easily meets its published specifications. Yaesu does publish a dynamic range specification (90 dB) related to certain test conditions, but really there is no universally agreed upon method to state this factor. Still, it is one of the most important factors to consider with a solid-state receiver. The best that can be said is that the FT-107M seemed to perform as good or better in this regard as any transceiver yet tried. The acid test in this regard in the European area, where I am located, is trying to work c.w. DX on the low end of 40 in competition with the 250 and 500 kw BC stations that are present. A number of European amateurs have commented that the FT-107M has one of the best designed front-ends they have encountered. Apparently, the gain distribution between the dual-gate FET r.f. amplifier and the i.f. chain, use of Schottky diode double-balanced ring mixer, etc., has struck about the best compromise possible between sensitivity and dynamic range. There will probably never be a perfect receiver front-end, of course, and external accessories such as super low-noise preamplifiers and sharp bandpass filters will always prove useful in specialized situations. However, they should not be necessary for any usual station installation using the FT-107M. In spite of its good front-end, Yaesu must be given credit for still putting a switchable 20 dB attenuator in the receive antenna line. Some designs avoid this because it creates the "impression" of some deficiency in the design. But, in reality, any receiver front-end can be overloaded if one connects it to "enough" antenna and signals are very strong.

Tuning "feel" is pleasant with the main tuning knob covering 25 kHz per revolution. The clarifier (RIT) control, as mentioned, covers about ±4 kHz which is a bit too broad. There is, however, a way to "vernier" the RIT action if a DMS unit is installed since the memory fine tune control shifts only ±500 kHz. This requires, however, that a received frequency be temporarily placed in a memory. The RIT feature is a bit unusual in that a push-button is provided to select this action on either receive or transmit. Being able to select it on transmit also makes some sense after a while. If one tunes in a station, especially on c.w., using the clarifier control, and wants to quickly get right on its frequency to transmit, one need only press the "TX Clarify" button. It saves a considerable amount of time as compared to retuning the transceiver for transmit using the v.f.o. tuning.

The performance of the variable bandwidth feature is excellent. It can really make the difference between a solid or dismal QSO on either c.w. or s.s.b. Being able to continuously vary the i.f. bandwidth without having to do any v.f.o. retuning is quite an experience if one has been only used to simpler i.f. notching or shifting techniques. Yaesu does supply as optional a 600 Hz fixed bandwidth c.w. crystal filter. But, there would hardly seem to be any need for it since the variable bandwidth feature can reduce the i.f. bandwidth down to 300 Hz. An exception might be for avid c.w. DX'ers since the fixed 600 Hz filter does have steeper "skirts," but I would still predict poor sales for the 600 Hz filter!

The audio peaking and notching circuits provided can help a bit under QRM conditions, but nothing like the action of the variable bandwidth feature. The peaking circuit is useful only on c.w. and its use will reduce background noise while peaking a selected frequency. No "ringing" is present. The notching feature can be useful in any mode, but it is difficult to adjust since it is quite sharp. In practice, it was found easiest to set the control switch to "peak," peak tune an undesired tone, and then put the control switch in its "notch" position. Used in this manner, the notching action was found to be very effective in eliminating heterodyne tones. Between the use of the variable i.f. bandwidth control and the audio peak/notch filter just about any QRM situation can be handled. There would not seem to be any need for any accessory items to help in the selectivity area.

The noise blanker would appear to be quite effective although the FT-107M was not used mobile. Ignition noise from passing vehicles was easily eliminated and the blanker would even on occasion do a good job of reducing the effect of the Russian "woodpecker."

All the controls are conveniently arranged, and being right-handed, at least I was glad to see a rig again with the a.f. and r.f. gain controls to the left of the main tuning knob. It is true that the a.g.c. in the FT-107M is very good and one does not often reach for a gain control. But, when really concentrating on tuning a weak signal, I usually end up with my right hand on the tuning knob and my left hand on one of the gain controls. The only fault that an avid c.w. operator might find with the controls is that the r.f. gain control is concentric with the a.f. gain control. It does make for slightly awkward adjustment if one continuously wishes to adjust r.f. gain.

The main option available with the FT-107M is the DMS unit. It provides 12 memory channels and is very easy to use. If one wishes to store a frequency set to by the v.f.o., one simply presses the

"M" button and it is stored in the memory to which the memory channel switch is set. One can go on tuning with the v.f.o. and store other frequencies as desired. When a new frequency is stored in a memory channel, the formerly stored frequency is erased. Two AA cells provide memory retention when the transceiver is turned off. To recall a memory channel, one sets the memory channel switch to the desired memory and turns the v.f.o. select switch to either MR or MR RX or MR TX. In the MR position the recalled memory frequency controls transceive operation while in RX or TX positions it controls only one function with the v.f.o. retaining control of the other function.

If one has recalled a memory channel and now wants to tune that channel up or down, the M Shift control is used, after depressing the "M Shift" button. It is a notched control that moves the frequency up or down in 100 Hz steps over a range of 500 kHz. The Memory Fine control provides a continuous ± 500 Hz shift. The clarifier control (RIT) is also fully functional when a memory channel is in use. If after using the shift control one wants to return to the original memory frequency, one simply releases the M Shift button. If one wants to memorize the new frequency to which the memory channel has been shifted, one presses the momentary M button. All the controls function very smoothly. The only thing that seemed a bit redundant was an "M" LED lamp which apparently was meant to indicate whether or not a frequency is stored in memory as the memory channel selector switch is rotated. But once one stores a frequency in all the memories, it is on all the time. Since any memory is free at any time to be "written over" with a new frequency, the indicator does not help. Perhaps it was intended somehow to indicate what memory channels were stored with frequencies depending on how the bandswitch is set. But, it doesn't appear to work that way.

The uses to which the memory channels can be put will vary with one's operating interests. The instruction book for the FT-107M gives a rather fanciful illustration of chasing a DX station which is constantly shifting its operating procedures frequency-wise. More mundane uses present themselves such as searching for a clear frequency while holding another one in memory, storing net frequencies, etc. Those forced to operate QRP with perhaps a poor antenna situation thrown in will find the memory possibilities very helpful. My experience in such situations has been that the best way to make contacts is to call stronger stations as they finish a QSO. With the memories one can tune through a band, store QSO frequencies of interest, and then check through them for the best opportunity to make a call. It saves an awful, awful lot of tuning. In any case, the 12 available memory channels should suffice for almost anyone's needs and all the versatility possible in using them is noteworthy.

The accessory YM-35 microphone has push-buttons on it for frequency scanning when a DMS unit is installed. Actually, the microphone contains only simple push-buttons. All the electronics for scanning are in the FT-107M/DMS and to have the scanning feature one simply has to use any sort of accessory enclosure with three simple, single circuit push-buttons. I constructed a simple scanning control "head" in a small sloping front metal enclosure which also contains the audio tune-up oscillator previously mentioned. Using the push-buttons takes the place of using the M Shift control on the FT-107M when a memory channel is recalled. Depressing the Up or Down button momentarily changes the memory frequency in 100 Hz steps. If either button is left depressed, scanning action starts at about 5 kHz/10 sec. If one of the buttons is depressed along with the Fast button, scanning is speeded up to about 100 kHz/10 sec. Perhaps Yaesu felt the scanning option was mainly useful for mobile operation. But, I find it also quite useful for home station operation. Once one gets the feel of using it, it becomes quite relaxing to lean back in the operating chair and scan over a band to check for activity.

Final Notes

There are various accessories available for the FT-107M, but it is actually a quite complete station in itself and extremely versatile with the DMS option. However, Yaesu certainly didn't forget those who will be connecting various accessories. The back panel of the FT-107M is virtually covered with various sorts of jacks for external connections. There are the usual jacks for an external speaker, separate v.f.o., a.l.c. out, linear amplifier switching, keyer, etc. In addition there are phone-patch jacks, a separate receive antenna jack, v.h.f. transverter connections, and a regulated 8 volt output. The latter was intended for a lamp in the matching Yaesu antenna tuner but actually comes in quite handy for powering all sorts of small station accessories that normally might use a 9 volt battery (keyer, mic-preamp, etc.).

The construction of the FT-107M appears quite rugged. Basically, it is constructed with all of the main circuitry on plug-in type PC boards except for the PA module and some small hard-mounted circuit boards. The main PC boards are individually shielded and well thought out so almost all internal adjustments are near the top of the board. The shielding over the board provides access holes and labeling for the adjustment of trim pots or capacitors on the boards. Looking at it, it would almost appear the Yaesu is making it easy for one to service the unit. This is true to a good degree and leads one to look at the instruction manual. The manual is a nicely organized, glossly stock production befitting the price class of the FT-107M. It contains all the usual instructions about usage of controls, connecting accessory units, operating precautions, etc. It is clearly written and one should have no difficulty putting the unit into use including DMS operation. However, more heartening is the fact that the manual goes into good detail about each circuit board, including diagrams of each and photographs of the component layout on each major board. There is a good deal of service and adjustment information so the amateur with some technical "savy" and reasonable test equipment can help himself to correct most simple mis-adjustments that might develop. The only board that is not covered in great detail is the DMS unit because of its specialized circuitry. There is a complete parts list for the transceiver, except for the DMS, and ordering information for spare parts. The only fault with the instruction manual centers about one amusing aspect and one frustrating aspect. The amusing aspect is that the "transceiver" is referred to as a "transformer" in several instances, which is quite a surprise in an otherwise technically competent translation. The frustrating aspect is that the diagram for removal of the top cover fails to note that the screws holding the carrying handle also should be removed. Not wanting to ruin the top cover by brute force removal, it took me about a half-hour to figure out the situation.

The FT-107M tested did not include the WARC bands as later models do (serials 06XXXX and up). However, the bandswitch does include provisions for two auxiliary bands in the sense that the wiring from the switches is carried to the PC board connectors. One or two boards containing the frequency translation and filtering circuits would probably have to be exchanged with Yaesu to implement operation on at least two of the new bands. Yaesu has advised that they will be introducing suitable conversion kits approximately six months ahead of the official availability date of each new band or bands.

Editor's Note

There are several versions of the FT-107 currently on the market. The units will vary slightly with regard to options. These units show differences with respect to country of purchase. In the United States, FT-107M units come with WARC provision and the DMS unit is included in the purchase price and factory installed. The author obtained his unit in Germany where he resides. Other specifications and findings in this review are consistent with units purchased in the United States.

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W1ICP sometimes takes part of the joy out of life by removing all of our excuses. Once again he does this by showing that an antenna can be rigged almost anywhere and for almost no money.

Boarding House Specials
or
Making Due With Limited Space Antennas

BY LEW McCOY*, W1ICP

Do you live in an apartment, boarding house, RV, trailer, college dorm, or some other form of closet? Have a hard time getting a signal out? Here are some answers to those sticky problems. I won't guarantee they will work, but they should be better than nothing!

With all the questions asked over the years, the one most frequently encountered is this: "I live in an apartment and am not allowed to put up an outside antenna. Is there anything I can do to get a signal out?" This question, and variations of it, appears to be the number one amateur radio problem. What with high interest rates for mortages and property cost, the problem isn't going to go away. It appears that "antenna farms" are going to be much more difficult to come by for the average ham. Trying to answer this question with one or two sentences is virtually impossible, so this answer is going to be a little long.

One could answer the basic question with a simple "yes," but that wouldn't really help, so let's describe some conditions and how best to treat them. "Will an indoor antenna work out?" Yes, but no where near as well as one that is outdoors. Building wiring, iron work, and the walls themselves affect the efficiency of any indoor antenna. Simply put, an outdoor antenna, even a poor one, is usually better than a good indoor antenna. But don't give up hope. When I first designed the Ultimate Transmatch I ran 100 watts, and using the Transmatch, connected a short wire to the bed springs and actually worked around the country on 80 meters! My wife didn't like the idea too much, but it worked!

*200 Idaho St., Silver City, NM 88061

It Can't Be Done—Or Can It?

Let's use an example of an amateur living in a three-room apartment and see what can be done. Most hams think in terms of a halfwave dipole and want 80 through 10 meter coverage (of course v.h.f. is not to be ignored). Can we make a dipole to cover all these bands and still put it in a small apartment? Yes, we can. The ideal outside 80-meter dipole would be one that is straight and horizontal and 60-plus feet high (and about 130 feet long overall). Of course that is out of the question for our three-room apartment, although I knew of one lucky ham who lived in a loft and put 135 feet, horizontal, straight, center-fed, that worked like a bomb!

Let's think first of getting 67 feet of wire laid out, the equivalent of a 40-meter dipole. Such an antenna will work on 40 and 15 fed with 50-ohm coax (RG58/U is OK) and with a few tricks can be made to cover the other bands as well. The idea is to run the wire along the ceiling or floor, or both, and to get a full dipole, which should be 33½ feet long on each side. You can run the wire around corners but avoid running the wire back on itself, such as down one wall, through a door, and back on the other side of the same wall. When the antenna is folded back on itself it doesn't work very well so avoid such runs. The wire can run along a ceiling edge, to a room corner, drop to the floor, and then along the floor. As to wire size, you can use any enamel-covered or insulated wire, from No. 12 to about No. 28—the size isn't critical, but it should be insulated. Small sizes are less obtrusive and work just as well. Also, the ends of the antenna should not be near any metal, such as a radiator or wall outlet (either of which could be grounded). The ends of an antenna usually have a fairly high r.f. voltage present and could cause arcing to ground. Fig. 1 shows some configura-

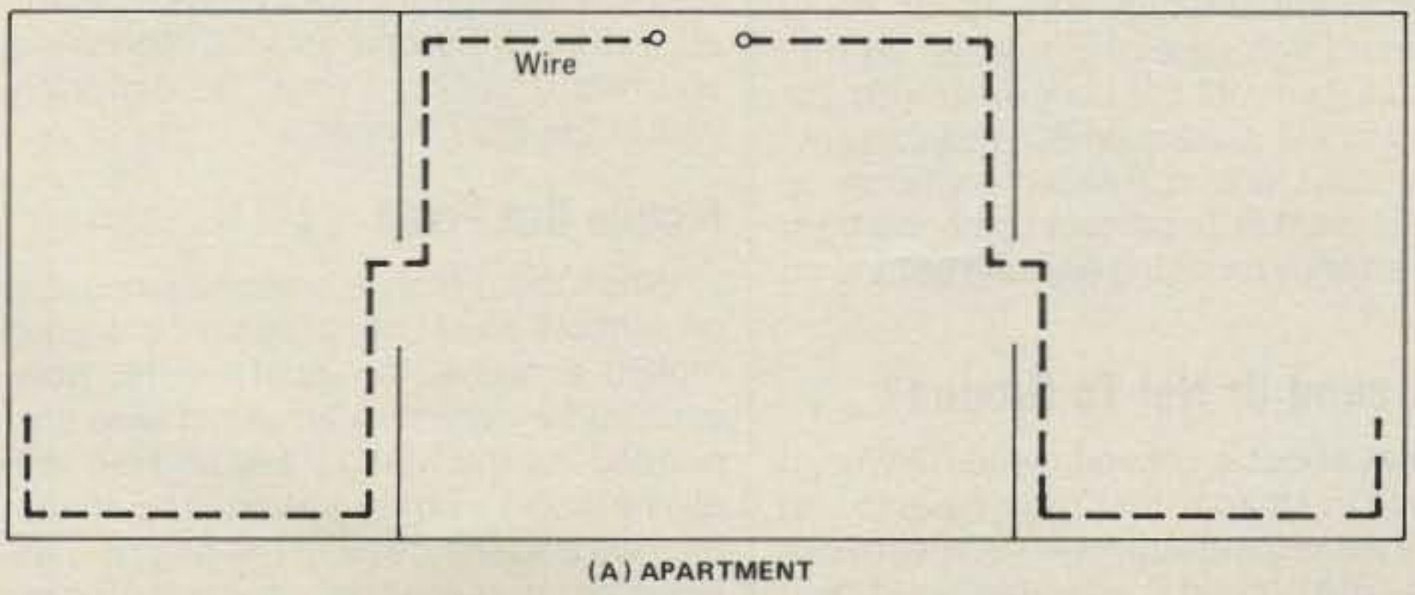

Fig. 1– Some basic configurations for stretching antenna wire around an apartment or other restricted area.

Having little or no apparent space to operate is another excuse taken away by W1ICP. Where there is a will there is a way. Here is Mac armed with an "807" operating from the bottom of a closet.

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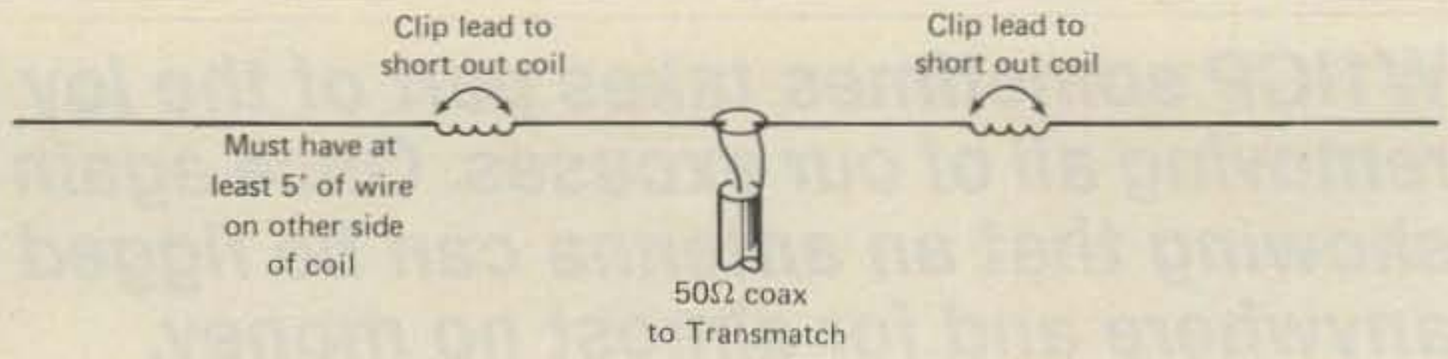

Fig. 2– The ubiquitous all-band indoor dipole. See text for details.

tions worth trying in forming your antenna.

If you feed the center of the 67 feet of wire with 50-ohm coax it should be somewhere near a matched system, but most likely it won't be. House wiring, metal objects, the height of the antenna (apartment) above earth all affect the feedpoint impedance and therefore the s.w.r. on the coax line. The only real answer is to use a Transmatch to couple the antenna system. The Transmatch will tune out the reactance and match the unknown antenna load to your rig. In fact, if you are going to be using random-length wire antennas or antennas made for limited space, the Transmatch is a requirement in your station. I don't have any particular recommendations as to which brand of Transmatch you should use except that it should work with any random-length wire or coax feed. Just one point here: You get what you pay for, so if it is a cheap Transmatch, don't expect too much from it.

An 80-Meter Dipole In A Closet—Almost?

With the Transmatch in the line as in fig. 2, you should be able to match the system on 40 through 10 meters without too many problems. In fact, and this may come as a surprise, you'll probably be able to get the 67-foot system to work on 80 meters. A 67-foot dipole on 80 should present a low enough impedance for your Transmatch to handle. However, you probably can improve the system by adding two loading coils to the antenna to make it somewhere near resonant on 80 meters. Take two 30-foot lengths of wire and wind each on any convenient round form—wooden dowel, toilet tissue cardboard, etc. (Use insulated wire of course.) Break your dipole antenna about 5 feet or so from each end and insert the coils into the antenna (see fig. 2). You'll also need a couple of clip leads so that you can short out the coils when you are not using the system on 80. You can cover the coils with a freezer container to protect them or to protect someone from inadvertently touching one and getting an r.f. burn.

To Ground Or Not To Ground?

What about a ground system? Well, if you live in an apartment you have to use whatever ground you have. Sometimes a water-pipe ground is available and if so, it should be connected to your equipment. That's more for safety's sake than anything else because the ground may or may not improve your signal.

In fact, you should experiment by getting signal checks with and without grounds, the loading coils, etc. You may find that one way the signal is much better into a certain area than with another hookup. A lot of amateurs believe a ground connection is necessary in order for an antenna system to work. This isn't true. Ground systems help, but they are not absolutely necessary.

Invisible Antennas

We have talked about a dipole system, but the wire of the antenna could be one continuous piece and fed on the end via your Transmatch—and this leads us to the sneaky part of the original question. Many amateurs who live in restricted areas use outdoor "invisible" antennas. When an enameled or formvar covered wire gets much smaller than No. 24 it is almost impossible to see unless you are just a few feet from it and looking right at it. This opens up a whole world of ideas for outside antennas. If you can get some wire out a window and up over the roof, or on the roof (a casting rod and reel is excellent to toss wires over roofs or trees!) then you really have it made. End feed the wire via the Transmatch and use it on all bands. One ham lived on the 30th floor of a high rise and he suspended a length of No. 28 wire out the window down about 100 feet or so and end fed it. He reeled in the antenna when he wasn't using it and no one was the wiser. We have known hams to make antennas out of No. 36 wire and use rubber bands for end insulators, but they usually wound up with bird problems. Birds cannot see the wire and fly into it, breaking the antenna! Incidentally, a college student I know built a four-element beam out of No. 28 wire, oriented it to work Europe and the Northeast, and had a heckuva time. He did pretty well in the *CQ* DX contest!

Mobile But Fixed

What about mobile antennas mounted on window sills? Lots of hams have used mobile antennas for apartments. However, to be honest, a length of wire suspended out the window and end-fed is in all likelihood a better system and cheaper. This also brings us to the flag pole antenna as another sneaky method of being patriotic and still working amateur radio. After all, no one can fault you for flying the

Say You Saw It In CQ

ing rod can be used by winding one long coil on it and feeding the wire at the butt end and of course a small version of Old Glory on the other end takes care of that.

V.H.F. And Repeaters

"How about 2 meters and repeaters?" One Godsend to amateurs has been the growing popularity of repeaters. In case you don't know what a repeater is at this late date, it consists of a receiver/transmitter combination mounted at some excellent high location. You transmit with low-power (a watt or so is usually enough to reach the repeater receiver) and the repeater receiver feeds your signal to the transmitter, repeating it. This in essence greatly extends the range of your very low-power. Many apartment dwellers who otherwise couldn't enjoy amateur radio have found a whole new way of life using repeaters. If you don't know about repeaters check with other local hams. Almost surely there is an operating system in your area. Here in the west, we have fantastic distances available with low power. Sitting next to me is a 10-watt rig. With the little transceiver, I can easily work a 300-mile radius. And that takes in a lot of hams even for New Mexico and Arizona. Back east (East Coast) a 40 and 50 mile radius was and is commonplace, so there is activity if you want to operate amateur radio from an apartment, or mobile for that matter.

RVer's

Much of what has been written here would cover trailer or RV residents. However, these units are metal covered, so one certainly has to have an outside antenna. Mobile antennas are a good answer to this problem. I recently tested the Spyder antenna made by Multi-Band Antennas. I roof mounted their antenna through the roof vent in the bathroom of my trailer. It was easy to set up and it really worked out very well. In metal encased mobile homes, one should rig up some kind of outdoor antenna. The roof of an RV makes an excellent ground system for whip antennas!

And last but not least—one other method I failed to mention,although I am sure there are plenty of others that will come to mind—is using an existing rain gutter for an antenna. If you can clip on to a rain gutter, it can make an excellent antenna. One ham we know used a rain gutter attached to his apartment and ran only 40 watts to work DXCC. Another ham did almost as well using some window screens hooked together and fed from a wire. Then there was the ham who sneaked a wire out and connected it to a long fence. It worked, but we wouldn't recommend running high power!

Amateurs have, in the past, been noted for their ingenuity. Let's keep that tradition alive. What novel limited-space antenna can you come up with? Make it cheap and dirty!

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The World of Video

A LOOK AT THE WORLD AROUND US

Holographic Video

Before delving into the array of "present day" information in this month's column, I would like to briefly share with you some thoughts on a possible future system which holds unlimited pioneering opportunities for creative innovators (please bear in mind primitive television systems began as early as 1925 and held few resemblances to today's "finished product"). I think you'll find the information quite interesting.

Holographic Video

While television concepts of various formats hold a dominant place in the limelight of modern communications technology, we foresee future evolutions producing some truly outstanding video techniques. Visualize, for example, a medium we will designate as simply holographic video. Although strictly a laboratory-type project at the present time, future applications involving holographic video would truly separate the television screen-movie display relationship. Communicated scenes would be projected, or recreated, in a holographic manner and within a specified display area of adjustable size. Blending into one's selected viewing area, such holographic scenes would permit viewing any and all of a communicated activity rather than merely those scenes and angles selected by the camera operator(s). While the "ultimate" holographic system would recreate full true to life displays right in one's home, several development phases will necessarily mark this progression path.

You may have seen three-dimensional holograms at science exhibits or modern-age museums. These holograms are produced by a coherent light LASER beam, split by mirrors, and directed into a rather dense cloud chamber (created by heat, dry ice, and fans—a technique used by some rock-band musical groups). The reconstructed images appear almost factual until one reaches straight through them.

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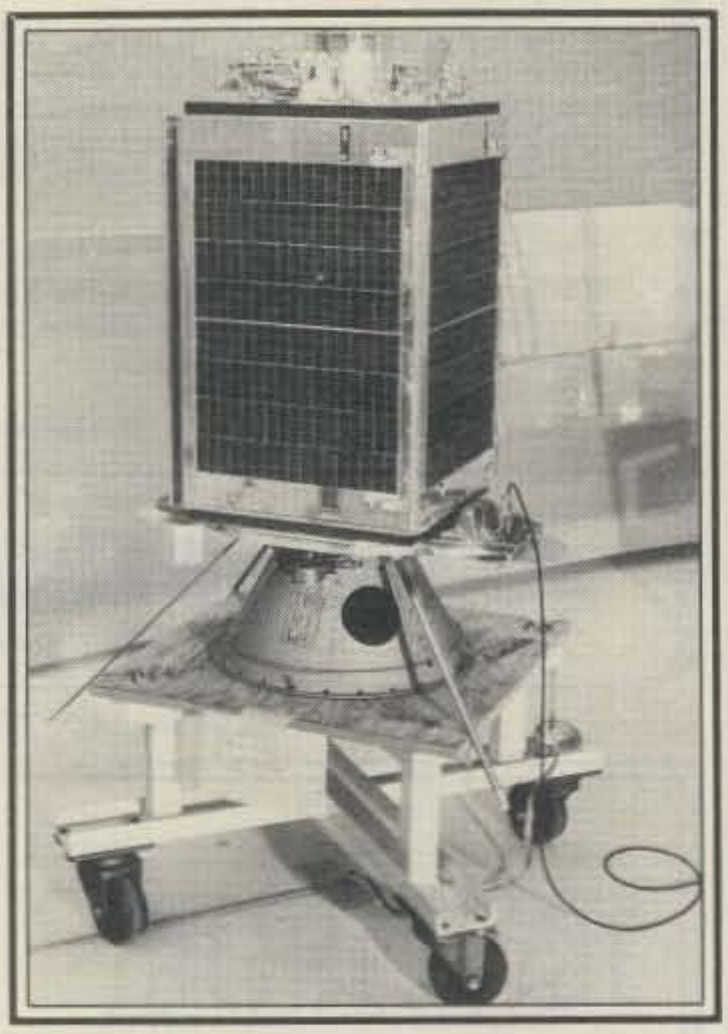

OSCAR 9 undergoes final checkout and analysis before its historic launch during October 1981.

There's an obvious technical gap between fixed image holograms and electronically scanned scenes. However, a multiphase evolutionary program could move this concept toward reality. A first phase, for example, might use "window" techniques similar to those shown in fig. 1. A low power LASER beam is directed through a diffusing lens and onto a photographic-type screen containing interference patterns of the original hologram. The viewer looks through the holographic screen to see the recreated image. Changing viewing angles permits viewing above and beside the holographic images. A close examination of these presently available photographic screens containing holographic interference patterns reveals a similarity to densities, colors, etc., in conventional LCD readouts. While Liquid Crystal Displays have thus far appeared primarily in numerical readouts, another change is on our horizon. High resolution LCD readouts for microtelevisions are being pioneered in Japan. These readouts are mass-wire interfaced to a matrix for digital control of the LCD screen, while scanning/video signals are directed to the digital control's "front end." This basic form of holographic video is a starting point within present grasp. Additional expansions could pioneer wideband, high information systems which would convey full LASER-scanned holographic video communications. Due to their high information content, these signals would probably be transmitted in the microwave spectrum.

Holographic video is a communications frontier wide open to pioneering efforts of today's amateurs. The system might easily become tomorrow's prime means of visual image transfer, and we suspect development. I had planned to include some photos of holographic video being compared to regular television in this month's column, but time wasn't available for setting up the display and working with photo exposures. We'll include those photos later.

Hard Copy for SSTV

A number of inexpensive yet high quality printers are coming out of Japan these days, and several of those units are capable of printing graphics or pictures of relatively good quality. These pictures are not the old-fashioned letter-formed scenes, but rather high-density views composed of numerous specially formed characters to create gray scales, smears, etc., similar to those found in actual pictures. The key to accomplishing these unique results involves gaining software control of a print head's individual wires and interfacing them to a memory-stored television picture. This technique of independently programming each dot in each letter's matrix produces a surprising amount of gray scale and picture resolution.

Clay Abrams, K6AEP, has been following trends in picture printing, and he recently developed a package for using the TRS 80C computer with an associated printer for producing hard copies of SSTV pictures (32 K of memory and extended basic required). Clay uses an Epson

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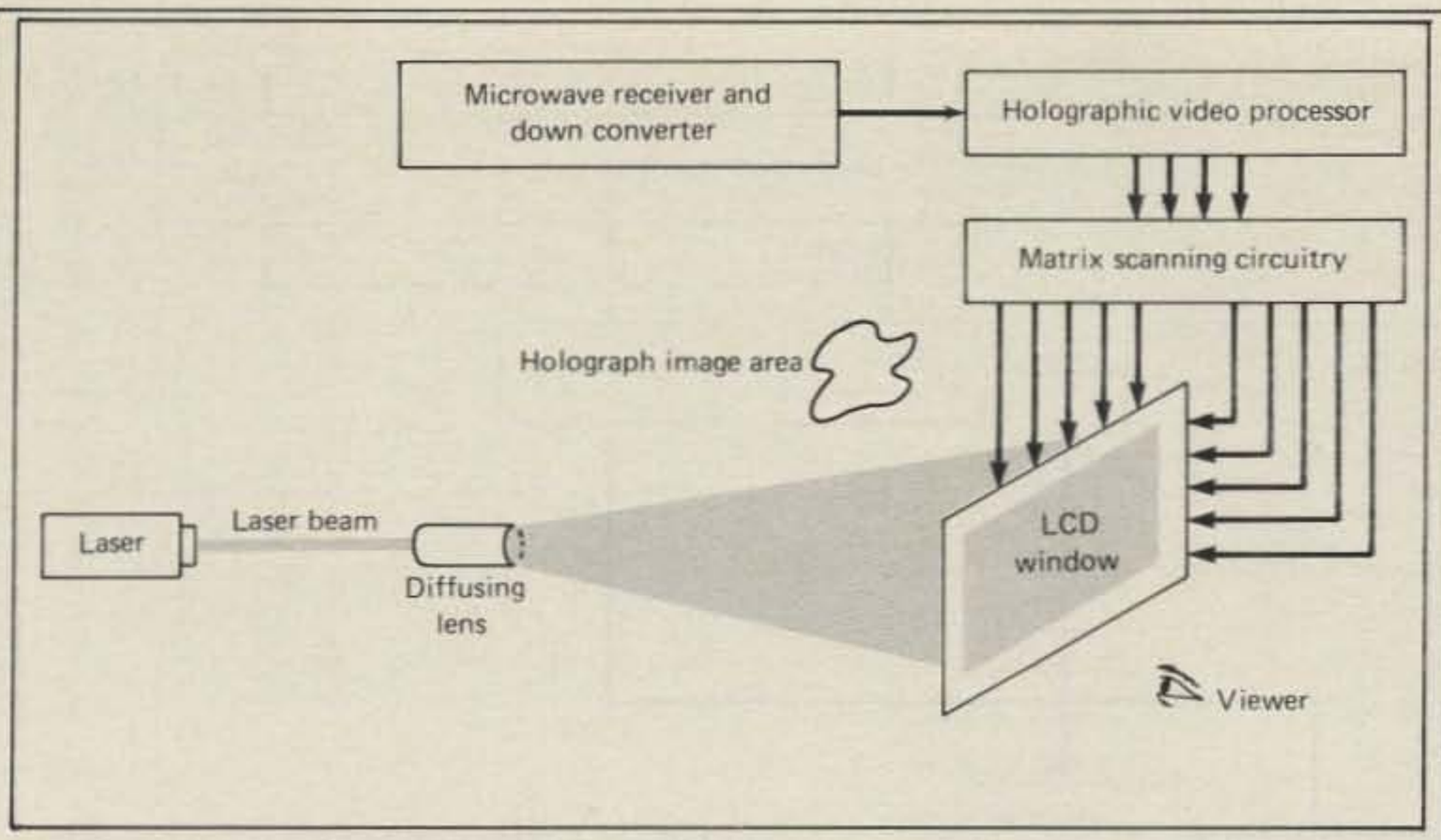


Fig. 1– This outline of a first generation holographic video system may pave the way for future developments with this unique mode. The system operation is discussed in the text.

MX80 printer along with his personally rigged graphics interface, thus bypassing the optional graphtrax feature which would otherwise be required. Other printers can be used for picture printing; one merely needs to gain control of a print head's matrix wires. Usual print times for a memory-stored SSTV picture range from five to twenty-five minutes, depending on dot matrix density and printer/interface baud rates. Picture printing could become a hot trend during future times; its capabilities range from instant QSL's to emergency/crisis readouts of incoming views. This area truly warrants watching (pardon the expression).

OSCAR 9's Video Status

OSCAR 9 continues to perform in an admirable manner; however, the University of Surrey still has the satellite involved in a series of test procedures. We understand that once these tests are finalized, an established set of parameters will be implemented for the satellite's earth-viewing CCD camera. Since the camera is one of several unique experiments aboard the spacecraft, it must share test times with other projects. The camera's format can be modified by ground control so we're somewhat "in the dark" until the University settles formats and places the camera in a particular time slot of operation. As of this writing, the camera has been activated only a couple of times: once for checking a simple test pattern and once for viewing deep space. Good results were obtained during both of those operations, so the camera's future seems quite promising.

The camera itself is known as the video imaging experiment. Its operation consists of a 65,000 bit **C**harge **C**oupled **D**evice (CCD) array placed behind a camera lens in the satellite's bottom, an adjacent storage area alongside the array for buffering, and a RAM storage area called the Video Display Experiment module. Video information appearing on the CCD array can be moved to the adjacent storage area at any of several preset clocking rates between 4 and 16 ms, hence the variable formats previously mentioned. The digitized video is then moved into the Video Display Experiment module and held until directed to modulate the 1200 baud general engineering beacon transmitter on 145.825 MHz. The latest word from the University of Surrey concerning video formatting is 256 lines by 256 pixels; each containing binary counts of 0 to 16 for grey scale descriptions, and a 32 bit sync pulse for each line. Possibly by the time this column appears in print, clocking/scanning rates and camera operational times will be firmly established. Check with the Saturday SSTV Net or W1AW bulletins for up-to-the-minute details.

Don't become discouraged over the long delays with experiments and tests of OSCAR 9's systems. The satellite has a predicted long lifespan and our day of use is surely coming. The satellite is, indeed, a departure from traditional OSCAR communications satellites predominantly orientated towards two-way communications. This is a one-way communications spacecraft with a number of unique mission objectives. Among these objectives are the ability to provide radio amateurs and professional scientists with a tool for studying geomagnetic disturbances and their effects on the full spectrum of radiowave propagation, an evaluation of new frequencies for use with future amateur satellites, a computer-comparable means for introducing the populace to basic satellite reception via low cost ground station systems, demonstration of the significant contribution capabilities of a small and inexpensive spacecraft of English or-

This hard copy SSTV picture featuring extended grey scale and high resolution was reproduced on an Epson MX80 printer. Interfacing and software was developed for amateur use by Clay Abrams, K6AEP.

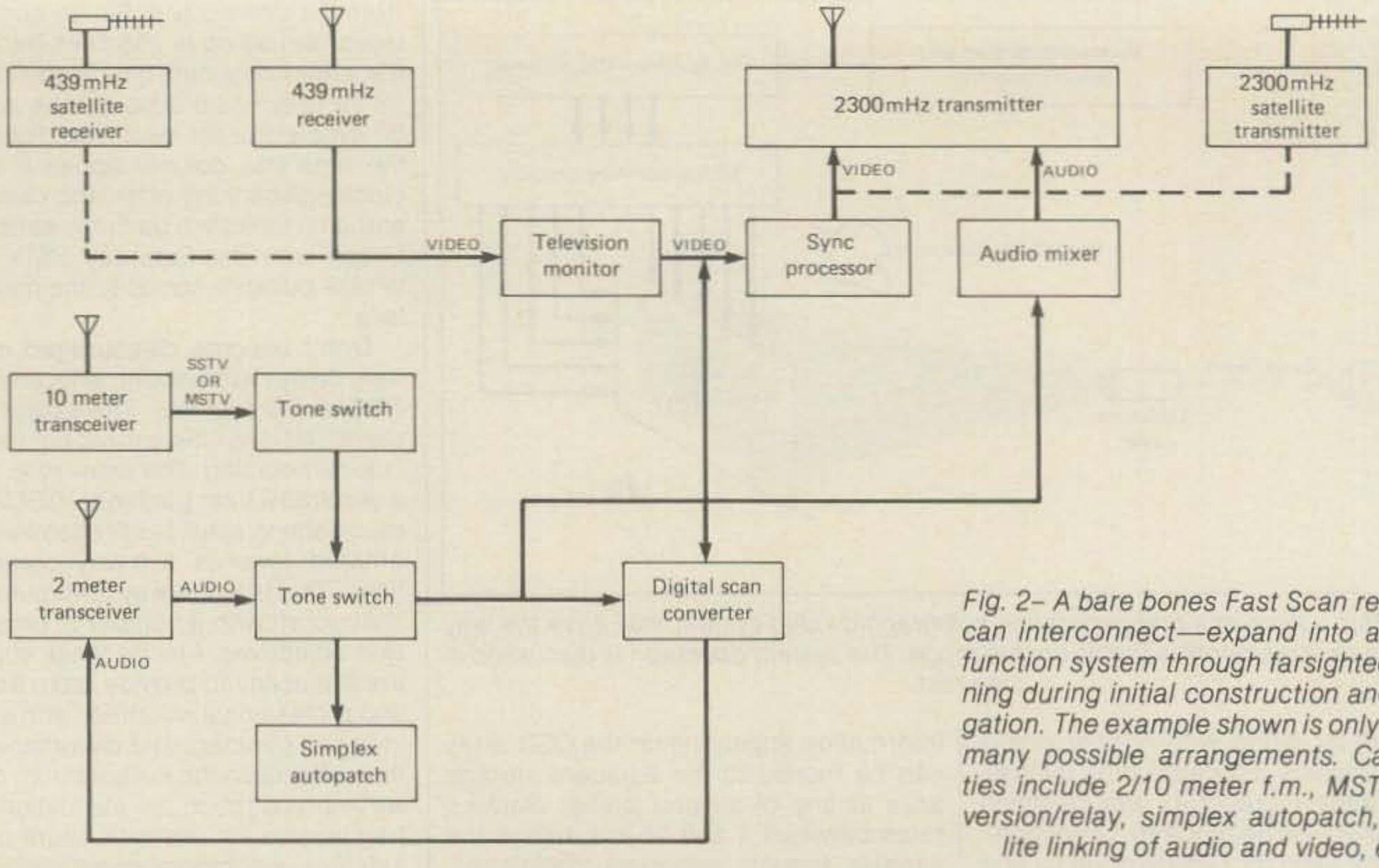


Fig. 2– A bare bones Fast Scan repeater can interconnect—expand into a multi-function system through farsighted planning during initial construction and instigation. The example shown is only one of many possible arrangements. Capabilities include 2/10 meter f.m., MSTV conversion/relay, simplex autopatch, satellite linking of audio and video, etc.

igin, and finally the video imaging experiment which can act as a low-altitude amateur weather satellite. The first months in a satellite's orbital life are hectic; the long term enjoyments begin after things finally settle down. OSCAR 8 operations, for example, were quite difficult for several months after launch. Today, however, a comparatively low number of users permit very enjoyable satellite operations. Hang in there—for as my TAB book *OSCAR: The Ham Radio Satellites* relates, good times are a 'coming.

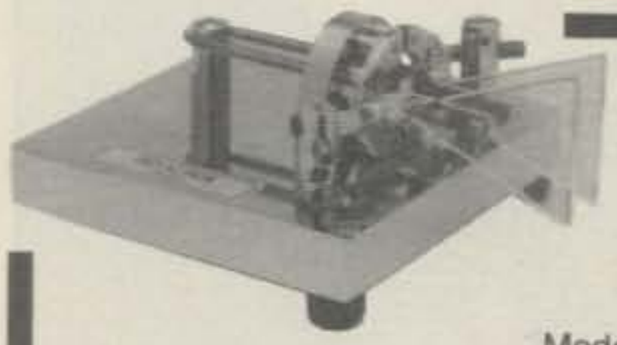
FSTV Repeater Ideas

As you've probably noticed, Fast Scan TV activity is showing a marked upswing in almost every area sporting a reasonable amount of amateur video enthusiasm. Now's the optimum time for joining these activities, so how about rigging your own system this summer! A relatively miniscule number of amateurs can pool resources and construct a bare bones FSTV repeater for supporting their activities while furthering area involvement. As activity grows and additional amateurs join the game, such bare bones repeaters can be expanded into more sophisticated machines. A bare bones Fast Scan TV repeater consists of a crystal controlled receiving converter, a small television set/monitor, a horizontal sync decoder for T/R action, a 3 or 4 amp power supply, a transmitter, and two omni-directional antennas. Simple enough, eh? The PC Electronics—available MMC439 receiving converter and TD-1 sync decoder plus either the PC Electronics RTX-1 repeater transmitter module or the Universal Communications 2300 MHz transmitter, along with their associated antennas, "round out" such a system.

We personally suggest a crossband ATV repeater operating on 439 MHz input and 2300 MHz output, as it eliminates the need for special filters, while permitting use of relatively inexpensive 2 gHz downconverters "in front" of an unmodified television set for amateur reception. This approach is also beneficial for introducing "outsiders" to an area's ATV activities. Since a good repeater site is seldom limited to the installation of one particular machine, future combinations/interconnections of various units could produce some interesting results. A 2 meter link, for example, could be tone-switched for 2300 MHz video mixed output or a Slow Scan/Fast Scan converter could be added to the setup. The scan converter would accept 2 meter Slow Scan or 70 cm Fast Scan, with subsequent output on its respective band. The further addition of a 10 meter transceiver would prove 2 meter to 10 meter f.m. linking, remote-SSTV operation on 28,680 kHz or Medium Scan TV, operation on 29,150 kHz. Meanwhile, repeater operators enjoy the activities via their basic Fast Scan setups. A general outline of this arrangement is shown in fig. 2.

That wraps up this month's happenings, gang, but several interesting items are taking shape for next issue. We plan to delve into amateur weather-video systems, plus more on SSTV and microwave television. Meanwhile, we'll be keeping an eye and ear for you on 20 and 10 meters . . . and watching the mail for your letters and photos of interest to all.

73, Dave, K4TWJ



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Antennas

DESIGN, CONSTRUCTION, FACT, AND EVEN SOME FICTION

The H.F. Yagi: Part IV - Care and Feeding

In this concluding segment of our discussion of the h.f. Yagi antenna, W8FX delves into the three areas of major concern. These areas are feeding, matching, and tuning the Yagi antenna. Several methods are presented and discussed. A bibliography follows with suggested readings on this interesting and popular antenna.

Generally, coaxial cable is used to feed the rotary beam, in common with most other popular antennas. However, practically any of the usual methods of dipole feed can be adapted to the driven element of the beam.

In some beams, the driven element is split in the center and the two halves are fed from a balanced source. This kind of arrangement is particularly suitable if open-wire transmission line is to be used to feed the antenna, though it is usually not desirable from a mechanical standpoint, since it means that the element halves must be insulated from the supporting structure. This complicates and weakens the structure.

A folded dipole is sometimes used as the driven element, in which case a balanced transmission line may be directly attached to the element. A two-wire folded dipole can provide a good match to 300 ohm line, while a three-wire folded dipole can result in a good match to 600 ohm line. Alternately, an impedance matching network may be used to couple the high impedance transmission line to the very low impedance termination offered by a single-wire dipole driven element.

Another approach to feeding the split dipole driven element is by means of a linear matching transformer, known as a **Q-section.** This is an electrical quarter wavelength of transmission line having a characteristic impedance that is the geometric mean between the two impedances to be matched. If a low impedance load (the antenna) is placed across one end of the quarter-wave line, it will be transformed into a high impedance across the transmission line. The Q-secton can be configured to work with either coaxial or balanced transmission lines.

*317 Poplar Drive, Millbrook, AL 36054

The balun is one of the more commonly used devices to achieve effective power transfer from the transmission line to the antenna. The device, coming from the term "balanced-to-unbalanced" converts from the unbalanced coax to a balanced output by transformer action. The Palomar 1:1 ratio balun shown here matches 50 or 75 ohm coax to 50 or 75 ohm balanced loads. The 4:1 ratio version matches 50 or 75 ohm coax to 200–300 ohm balanced loads. An adjustable U-bolt provides for convenient mounting to mast or boom; teflon insulated leads connect to the beam's driven element. (Photo courtesy Palomar Engineers)

Baluns or **bazookas** are also popular devices used to feed the split driven element. The *balun* is a device that matches an unbalanced coaxial transmission line to a balanced load, such as a dipole or a Yagi driven element. The balun can become very important to the successful feeding of the Yagi, since it can help equalize r.f. flow and prevent antenna current from flowing down the outside of the coaxial cable, which could unacceptably distort the radiation pattern of the antenna. Baluns can be 1:1 devices offering no impedance transformation, or they can be transformers in the sense that they transform impedance, usually in a 4:1 ratio.

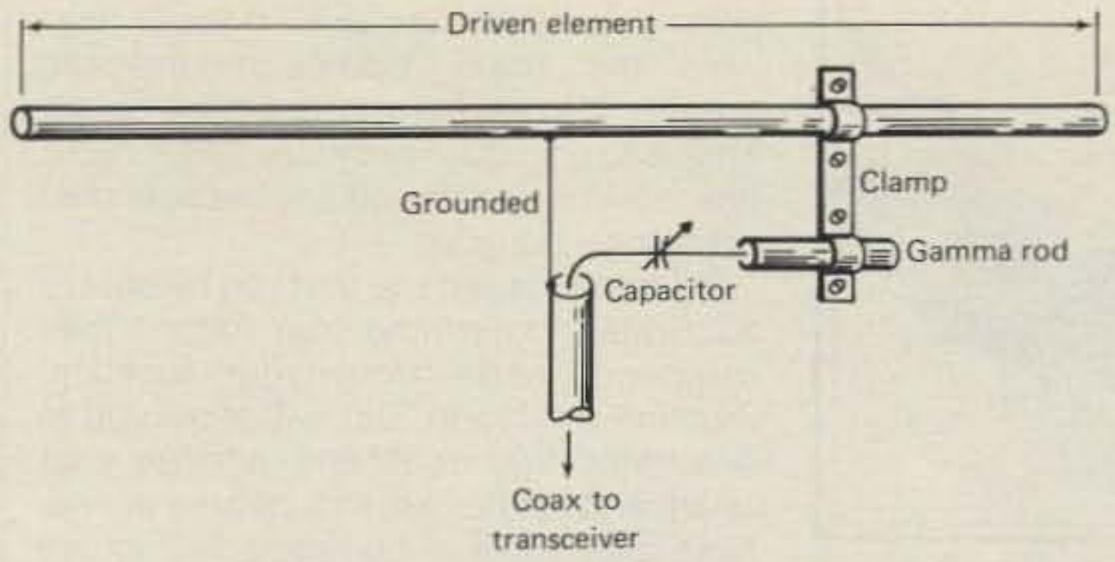
Several different types of baluns and bazookas are available. The classic coaxial *bazooka* is simply a shield placed around the feedpoint end of the coaxial transmission line, which is connected to the outer side of the line a quarter wavelength back from the line's end. The quarter wave detuning sleeve isolates the end of the outer conductor of the unbalanced coaxial line, thus permitting direct connection to a balanced antenna. Another type, the balanced bazooka, is similar in construction but uses a quarter-wavelength piece of coaxial cable rather than a sleeve. Both types provide 1:1 impedance match. A half-wave section of line, folded back on itself, can be made to act as a phase inverter to provide a 4:1 impedance match. This kind of balun would be used when it was desired to feed a folded dipole driven element with coaxial cable.

Increasingly common is the **broadband balun,** constructed either of coils or of a ferrite material, to effectively cover several frequency octaves. This kind of balun is especially useful in directly feeding the multiband Yagi having a split driven element. Inexpensive, low-loss beam baluns are readily available from a number of manufacturers.

The more popular, and mechanically superior, methods of feeding the Yagi array are based on leaving the driven element in one piece and shunt-feeding it with either balanced or unbalanced transmission lines. The oldest type of shunt-feed matching device normally used with parasitic arrays is the **delta-match**, in which the driven element is fed with a 300–600 ohm transmission line which is fanned or tapered-out as it approaches the driven element. This system allows a fair impedance match, but adjustment interacts with the driven element's tuning, making it inconvenient in practice.

A refinement of the delta-match is the **T-match**, a much easier to adjust adaptation. In the T-match, which resembles the *gamma-match*, there are two T-rods

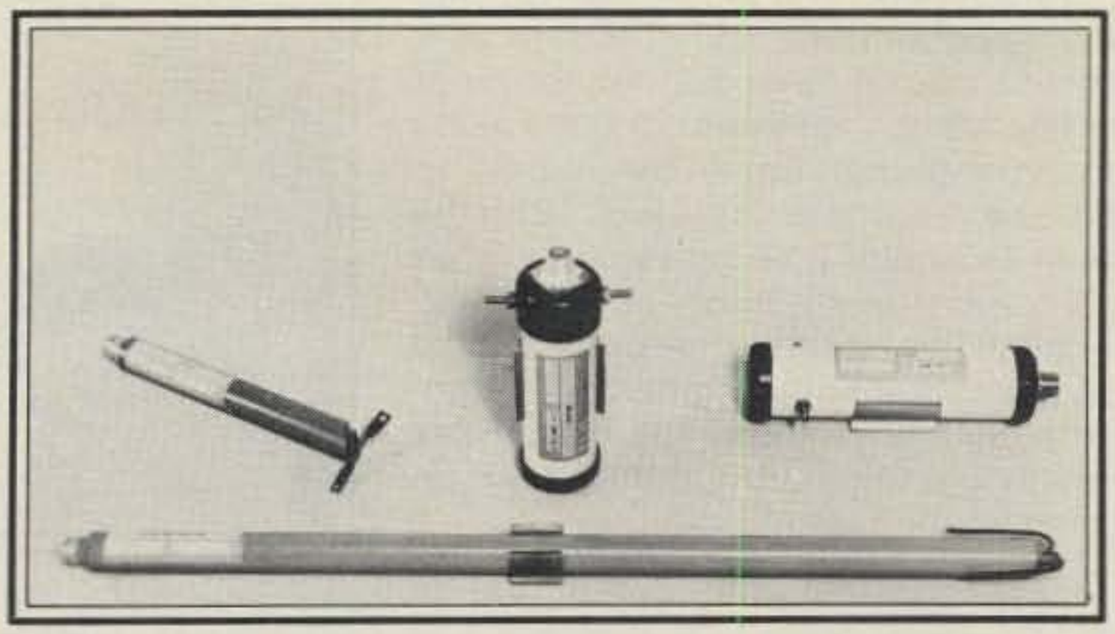
Say You Saw It In CQ



Illustrated here is a typical gamma-matching system, in which the coaxial transmission line is connected to the beam by means of a series capacitor and gamma rod. The gamma rod's diameter is small with respect to the diameter of the dipole element; the far end of the rod is shorted to the driven element by means of a moveable clamp.

In adjusting the system, the length of the gamma rod is adjusted along with the setting of the capacitor until the lowest possible s.w.r. is attained.

Fig. 1– The gamma match. Actually one-half of the older T-match, the gamma-match is probably the most popular Yagi beam matching device in use today. The device allows the driven element to be one strong unbroken length, and permits easy matching to coaxial cables.



When using balanced antennas with standard, unbalanced coax lines, it's wise to include a balun for optimum performance and to avoid antenna pattern distortion, particularly with beam antennas. Shown here are representative KLM ferrite-core baluns for h.f. use, and very low-loss sleeve types for operation on 2 meters and higher frequencies. The firm also sells a line of similar-appearing v.h.f./u.h.f. power divider/couplers for those who wish to stack beams for EME, DX, tropo, and satellite operation. These couplers or power dividers replace the usual "rat's nest" of matching cables and connectors required for beam stacking; they can be configured to handle from 2 to 32 antenna stacks. (Photo courtesy KLM Electronics, Inc.)

spaced a short distance from the driven element by means of adjustable straps; resonating capacitors are incorporated in each leg of the T-match for adjustment purposes. A further modification of the T-match combines the basic T-match with a balun transformer to match the unbalanced coaxial transmission line to a balanced split dipole driven element.

This brings us to the most popular beam matching device, the **gamma-match** (fig. 1). This device is really half of a T-match, and is used to match unbalanced coaxial line to either a balanced or unbalanced driven element. The device consists of a single "gamma rod" and a series resonating capacitor; the resonating capacitor acts to cancel out the detuning effect of the rod. Use of the gamma-match allows the outer shield of the coax to be grounded to the center of the driven element, which is good from a safety standpoint. For many reasons, the gamma-match is probably the best device to use when feeding the Yagi with coax.

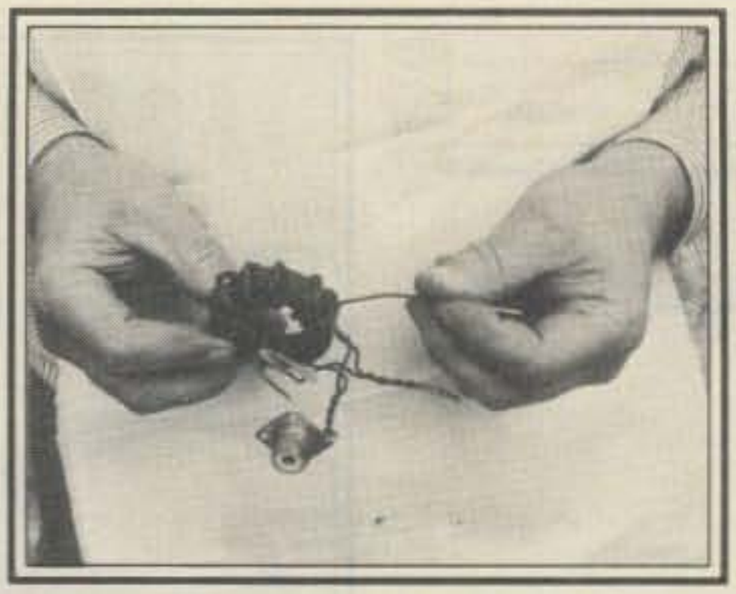
There are several versions of the gamma-match. In one version, known as the **coaxial gamma-match**, the resonating capacitor forms a portion of the gamma rod. In this case, the gamma rod is made of concentric sections of aluminum tubing; the capacitance is changed by varying the position of the outer aluminum tube. The so-called **tri-gamma-match**, or **triple gamma-match**, is really three gamma-matching units connected in parallel to feed a tri-band beam with a common transmission line. Each of the three gamma-matching devices is "cut" to the proper dimensions for the band it is to cover. In practice the lowest band is adjusted for minimum s.w.r. first, then the middle band, and then the highest band. Another refinement is the **omega-match**. In this device, the matching rod is made shorter than in the usual gamma match. Instead of making the impedance ratio adjustment by varying the length of the rod, this is done by varying the capacity-to-ground at the rod's terminating end. A second capacitor, in addition to the resonating capacitor, is required in the omega-match. Some amateurs find the omega-match more practical than the gamma match on large, low-band arrays, since the capacitor adjustments are close to the feedpoint, and adjusting the capacitors is more convenient than working with the shorting bar at the outer end of the gamma rod.

Tuneup and adjustment don't have to be a great deal more complicated or time-consuming than that involved with dipoles or verticals, particularly if the beam is a factory-made model for which dimensions and adjustments are "canned." In any case, the most important aspect of antenna tuneup is to ensure that the driven element is properly set. If set incorrectly, proper adjustment of the entire system will be difficult or impossible to achieve, and performance may be degraded. Resonant frequency can be set using only the "book" dimension, though a grid-dip-oscillator or antenna-noise-bridge can be put to good use to set resonance. Preliminary measurement and adjustment can usually be done with the beam lying on the ground, with the reflector resting on the ground and the director pointed skyward. The adjustment for the driven element should hold true in the air, and it's usually not necessary to specifically tune the reflector or directors. The matching system can be tweaked for a 1:1 s.w.r. between the feedline and driven element when the antenna is raised to its operating height. Multiband trap beam tuneup is more complicated, since the individual sections of the driven element "between traps" must be adjusted for best s.w.r., and adjustments between the various bands can interact.

We've indicated that it's not usually necessary to fine-tune anything but the driven element in most beams. However, in the case of wire element Yagis, or quads, the reflectors and directors should be tuned, preferably with the antenna installed at its ultimate operating position, since the fact that the antenna is constructed of wire makes it impossible to cut and install the wire elements to the exact dimensions required. If one wishes to precisely tune the beam, it is best done on a short temporary tower using a field-strength meter (FSM) or the S-meter of a receiver attached to a simple dipole antenna located several wavelengths from the beam under test. The beam can be tuned for maximum gain by carefully noting FSM or S-meter readings as the element lengths are changed.

As for array bandwidth, most close-spaced arrays show optimum performance only over a range of 1–2% of the design frequency, or up to about 500 kHz on 10 meters. One can "fudge" a bit, getting the antenna to work reasonably well over a wider range by specifically adjusting the director or directors to yield maximum gain at the highest frequency to be covered, and by adjusting the reflector to produce optimum gain at the lowest frequency. This procedure flattens the gain curve, resulting in some gain loss at all frequencies, but allowing a more uniform gain across a broad range.

Transmission line length has no *real* bearing on antenna tuning, though as a practical matter, changing the length of the line will change the impedance at the input (transmitter) end of the line. So, in some cases, where "all is well" with the beam except for a troublesome s.w.r. on one or more bands, it may be wise to experiment by inserting short (1/10 to 1/8-wavelength) line segments to effectively change the load the transmitter sees by changing the apparent s.w.r. on the line.



Homemade toroidal balun shown here offers a good match between an unbalanced coaxial transmission line and a balanced antenna. This unit is designed for a 1:1 impedance ratio, though 4:1 units are readily made or purchased.

On The Air

Now that the array has been installed and tuned up, what next? Effective beam employment may seem self-evident, but a few things should be kept in mind.

A beam isn't much good unless it's aimed properly. While h.f. beam accuracy doesn't need to be measured to the degree, an error of more than 10 degrees is too much. Key to proper beam alignment is an understanding of the great circle bearing. The angle that the great-circle (shortest) path forms with a line running due north through your QTH is called the **great circle bearing.** This is the bearing to which your antenna should be set for maximum signal strength over a given circuit. In some cases, the **long path** may be desired, in which case the antenna should be set to the reciprocal bearing, which is 180 degrees opposite from the outward bearing.

There are a variety of DX-antenna pointing methods in use; each has its advantages and disadvantages. Probably the most common method makes use of an azimuthal equidistant map; this kind of map is made especially for use in determining radio bearings. It's possible to purchase maps that show as the center a point at or near your station location. Using the scale of great-circle bearings printed on the map perimeter and drawing a line from the center through the location of the distant station, the desired great-circle bearing can be directly read from the scale. Computer-generated great-circle bearing charts are also available, and are usually constructed for your precise location. These are becoming increasingly popular.

All methods require that you be able to accurately determine *true* (rather than *magnetic*) north from your location. Sighting the North Star will allow you to determine *true* north and initialize your beam and rotator within a degree or two. Note that while a compass will locate *magnetic* north, you must allow for the proper amount of magnetic variation for your area.

Note that at times, the shortest path between two DX stations may not be the best way to aim your antenna. In such cases, long-path provides the best results, in which case the beam should be rotated 180 degrees. This is called the reciprocal bearing, as mentioned earlier.

A final point: in evaluating the practical performance of your beam, give it a chance to perform over a period of time. Be particularly careful of comparison signal reports with both nearby and distant amateurs. Put the antenna through its paces over a few weeks or months, under varying propagation conditions, different times of day, etc.

An Interesting Product

A low-cost product that should be of interest to the antenna buff—a fairly new one—is *Coax-Seal®*, a handmoldable plastic material that is used to seal otherwise leaky coaxial fittings from moisture and corrosion. This unusual material, manufactured by Universal Electronics, Inc., 1280 Aida Drive, Reynoldsburg, OH 43068, is a permanently pliable, rubber-based plastic. The inexpensive material stays flexible in any reasonable temperature from −30 degrees F to +180 degrees F, and it adheres to all surfaces, including the new polyvinyl coaxial cable sheaths to which silicon rubber based sealers will not adhere well.

The non-conductive, non-contaminating material is sure to save a great deal of grief in protecting coaxial fittings and other beam parts high atop a tower. For amateur use, the material comes in 60" × ½" rolls for overlap taping in the fashion of ordinary taping of electrical connections using plastic electrical tape. According to the manufacturer, the material has been demonstrated in the field to have a minimum of 5 years serviceability.

In the lab the non-toxic product has been shown to resist the sun's ultraviolet rays for at least 8 years. Burial is effective for at least 5–6 years.

I've used the material, and about the only complaint I have about it is that it's strange to touch—something on the order of a child's modeling clay—sort of "goopy," as the XYL might put it. But that

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characteristic seems a small price to pay for the job the material is capable of performing.

Summing Up

This wraps up our multiple-part discussion of the Yagi-Uda array. Over the course of several months, we have covered the basic dipole; parasitic element operation; two-, three-, and multiple-element arrays; the trap multiband Yagi; beam construction and installation; and feeding, matching, and tuning considerations. We have also highlighted beam operating techniques as well as some surely controversial "which is best" antenna pointers.

Is the Yagi *your* choice for an effective h.f. antenna? We'll never resolve whether it's *the* best choice for DX, since that decision depends, in the final analysis, on what *you* want in an antenna. For many thousands, however, the Yagi represents a virtually unbeatable antenna.

Next month, we will continue with another antenna subject of timely interest. See you then.

73, Karl, W8FX

Bibliography

The following sources should provide good reading, an extended technical discussion, and construction details for those who wish to pursue further the subject of Yagi-Uda arrays:

Althouse, Jack, K6NY. "Antenna Tuning with a Noise Bridge," *Ham Radio Horizons,* November 1978.

Bartlett, Jim, K1TX and Stan Gibilisco, W1GV. "The 3-Element 10-Meter Cheapie," *QST,* March 1979.

Boyer, Joseph M., W6UYH. "The Multiband Trap Antenna, *CQ*, February-May 1977.

Buchanan, Chester L., W3DZZ. "The Multimatch Antenna System," *QST*, March, 1955.

Fish, Jim, W1HR. "Let's Talk About HF Antennas," *Ham Radio Horizons,* June 1979.

Hoff, Irvin, W6FFC. "Beam Antenna Headings," *Ham Radio*, April 1972.

Koerner, Margaret, KØIQ. "The Aerial Performers of the Radio Circuits, *QST*, November-December 1978.

Johnston, William D., N5KR. "DX Antenna Pointing," *Ham Radio Horizons,* August 1978.

Lawson, James L., W2PV. "Antenna Gain and Directivity Over Ground," *Ham Radio,* August 1979.

Lindsay, J.E., Jr., WØHTH. "Quads and Yagis," *QST*, May 1968.

Lawson, James, W2PV. "Yagi Antenna Design," *Ham Radio,* May 1980.

McMullen, Tom, W1SL. "Beam Antenna Hints & Hardware," *Ham Radio Horizons,* June 1979.

Orr, William S., W6SAI. "Ham Radio Techniques" column, in *Ham Radio,* January 1981.

Orr, William S., W6SAI. "Ham Radio Techniques" column, in *Ham Radio Horizons*, December 1980.

Phillabaum, Steve, K7NR. "Installation Techniques for Medium and Large Yagis," *QST,* June 1979.

Roberts, Walter, W3CHO. "The Compact Uni-directional Array," *Radio,* January 1938.

Ross, Donald G., Jr., W2JMZ. "How DX Kings Rate Antennas," *QST*, January 1964, p. 75.

Schauers, Charles J., W6QLV, "Ham Clinic" column, in *CQ,* December 1958.

Slepian, Michael, WB2LKO. "Towering Aspirations," *Ham Radio,* February 1980.

The Radio Amateur's Handbook, American Radio Relay League, 1981 edition.

The ARRL Antenna Book, American Radio Relay League, 1974 edition.

Thurber, Karl T., Jr., W8FX. "The Dependable, Ubiquitous Dipole," in two parts, Antennas Column, *CQ,* July and August 1980.

Thurber, Karl T., Jr., W8FX. "The Trap Dipole," in two parts, Antennas Column, *CQ,* February and March 1981.

Thurber, Karl T., Jr., W8FX. "All About Traps and Trap Antennas," *Ham Radio Horizons,* August 1979.

Wilson, Alf, W6NIF. "Trap Yagi Antennas," *Ham Radio Horizons,* June 1980.

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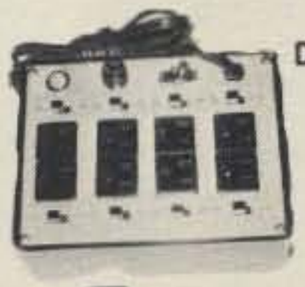

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CIRCLE 30 ON READER SERVICE CARD

a monthly feature by
BILL WELSH, W6DDB

Novice

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Shortwave Listening—Part I

Shortwave listening (s.w.l.'ing) can provide an interesting and exciting introduction to radio. S.w.l. activity is also of continuing interest to many experienced licensed amateur radio operators. I am not an avid s.w.l.'er, but I do enough listening to understand how some people remain s.w.l. enthusiasts for decades. The air around us is filled with millions of radio signals every day; all you need is a receiver, antenna, knowledge, and patience to bring the world into your home. It is fascinating to listen to the conversations, terse communications, and broadcasts that saturate our airwaves.

This article is too long to be printed in a single issue of this magazine; consequently, it has been divided into several parts. Each part is written to provide useful information if read by itself; however, the entire article should be read (and reread) to derive maximum benefit.

Beginning s.w.l.'s usually listen to international shortwave stations broadcasting programs on the high frequency bands. As they become more knowledgeable, s.w.l.'s usually become more selective in their listening habits. Some s.w.l. setups are more extensive and complex than most amateur radio stations. This article covers many facets of shortwave listening.

A good s.w.l. setup allows you to receive many types of signals from all parts of the world and (nowadays) space. It is common to get started as an s.w.l. by listening to amplitude modulation (a.m.) broadcasts in the high frequency (h.f.) range (3–30 megahertz). Some s.w.l.'s soon increase their listening activities to include single sideband (s.s.b.) and narrow band frequency modulation (n.b.f.m.) voice reception. Some dedicated s.w.l.'s then learn the International Morse Code (English alphabet code) and start copying radiotelegraph transmissions. If their interest is strong enough, and their financial situation allows it, the advanced s.w.l. expands the station to enable the interception of frequency modulation (f.m.), radioteletype (RTTY), slow scan television (SSTV), facsimile (picture, no sound), standard (fast scan) non-broadcast TV, and other exotic modes. Advanced s.w.l. fans do not restrict their activities to the h.f. band. Many also enjoy using the very high frequency (v.h.f., 30–300 MHz) and ultra high frequency (u.h.f., 300–3000 MHz) bands. Other s.w.l.'s develop listening interests on the medium frequency (m.f., 300–3000 kilohertz), low frequency (l.f., 30–300 kHz), and very low frequency (v.l.f., 3–30 kHz) bands. Listeners who use these low frequencies are loosely grouped with shortwave listeners because many listen to both short and long radio waves. However, those who listen on low frequencies are really longwave listeners (l.w.l.'s). To put the difference in proper perspective, a 30 MHz signal is 10 meters long (about 32.8 feet), whereas a 30 kHz signal is 10,000 meters long (about 32,800 feet). Since the v.l.f. signal is 1000 times longer than the h.f. signal used in this example, it is easy to understand that those who listen on the v.l.f., l.f., and m.f. bands call themselves longwave listeners.

This is a photograph showing Bill Welsh, W6DDB, presenting an award to Arthur Godfrey, K4LIB, at the Los Angeles chapter of the American Red Cross. The occasion was the 40th anniversary celebration of the first pint of blood collected by the Red Cross in Los Angeles. Arthur helped initiate the "GAPSAL" (Give a pint, save a life) activity at the start of WW II; this group was highly successful in getting entertainment industry people to donate blood for war zone use. Bill is a multi-gallon blood donor who is very active in the Los Angeles area blood program.

Table I shows the band designations and corresponding frequency ranges. It is good to know them since they are referred to in s.w.l. literature

Frequency Range	Designation	Abbreviation
30–300 Hz	Extremely Low Freq.	e.l.f.
300–3000 Hz	Voice Freq.	v.f.
3–30 kHz	Very Low Freq.	v.l.f.
30–300 kHz	Low Freq.	l.f.
300–3000 kHz	Medium Freq.	m.f.
3–30 MHz	High Freq.	h.f.
30–300 MHz	Very High Freq.	v.h.f.
300–3000 MHz	Ultra High Freq.	u.h.f.
3–30 GHz	Super High Freq.	s.h.f.
30–300 GHz	Extremely High Freq.	e.h.f.

Table I– Band designations and corresponding frequency ranges.

In addition to a good setup, an s.w.l. must have the patience of a saint to be successful. If you quickly tune across a high frequency band (as you normally do tune across the standard a.m. and f.m. domestic broadcast bands), all you'll hear will be "squeaks" and "squawks" as you pass through stations too quickly. You must learn to tune slowly and carefully on the shortwave bands.

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*Shortwave reception will vary with antenna, weather conditions, operator's geographic location and other factors. An outside antenna may be required for maximum shortwave reception.

†Based on a comparison of suggested retail prices.

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1981: Model 60 loaned to field supervisor, falls to concrete floor. No damage.

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1976: Model X knocked off workbench. Case replacement: $25.00.

1976: Technician drops Model X onto warehouse floor. Case and meter replacement cost: $58.00 plus 2 week downtime.

1980: Technician loans out Model X, heavy box dropped on it in back of van. Case, meter and switch broken. Unrepairable, replacement cost $115.00.

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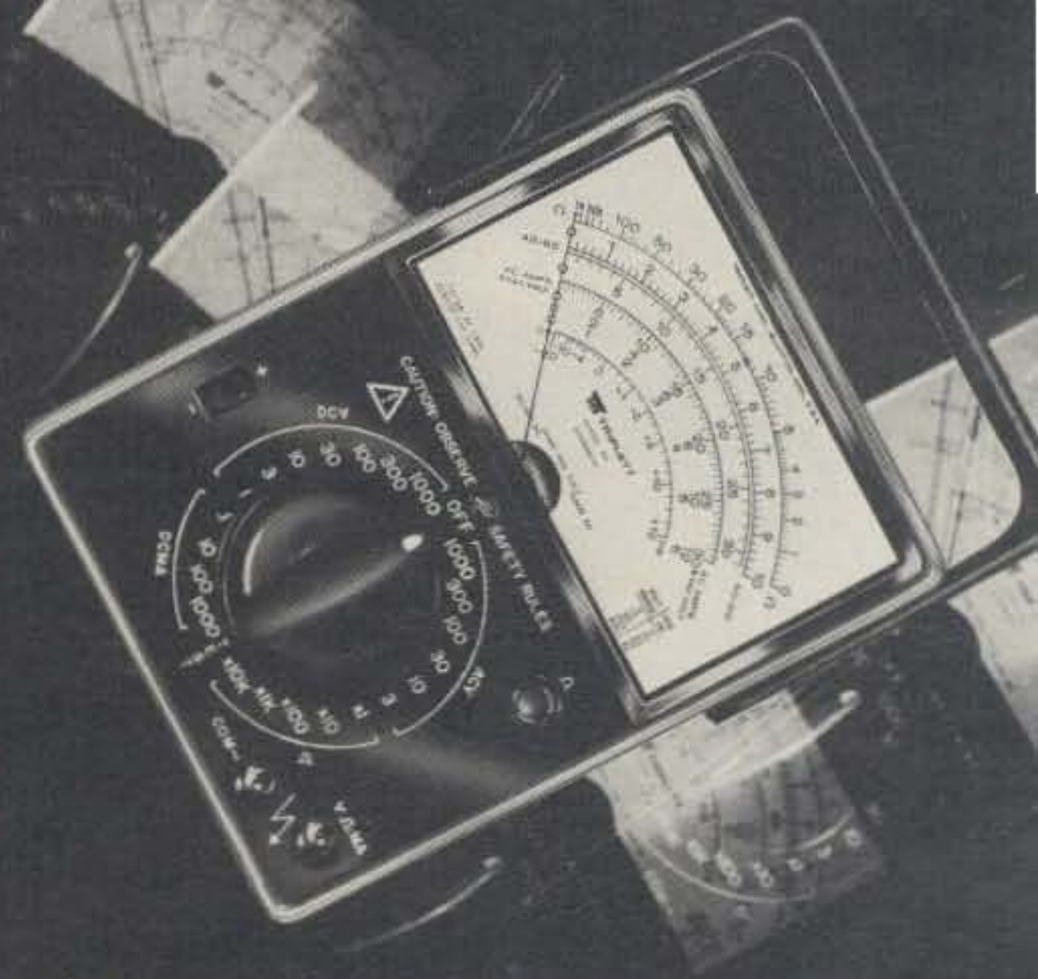

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CIRCLE 97 ON READER SERVICE CARD

Legality Of Eavesdropping

It is legal to listen to all types of radio transmissions, but there are restrictions against using or disseminating information you get from stations other than broadcast stations. The Secrecy of Communications Act states that one cannot disseminate or use information obtained from non-broadcast transmissions. Simply stated, private messages are the property of the person or group to whom they are addressed.

Information obtained from broadcasts transmitted by foreign and domestic (U.S.A.) stations is not subject to secrecy provisions. Broadcasters want listeners to tell other people about their programs. They transmit music, news, and educational programs using directive antenna systems. Those of us who understand English enjoy an extra s.w.l. advantage because English is the universal language used on the air by all radio services. Even foreign stations transmitting broadcasts in their own languages indentify in English.

Emergency (life or death) transmissions are also exempt from secrecy requirements. When life is at stake, we are allowed to make use of all available information to aid those who are in danger.

Variety Of Transmissions

There are too many types of transmissions to be listed in this article. In addition to domestic and foreign broadcasts, here are a few typical examples of transmissions you could hear:

airplane to airplane, tower, or other ground station
amateur to amateur
ambulance or taxi to dispatcher
Citizens' Radio Service (CB)
Civil Defense
fire
Forest Service
government civilian agencies
military, including Military Affiliate Radio System (MARS)
police
Radio Amateur Civil Emergency Service (RACES)
Red Cross and other disaster services
ships, including yachts and tugs

Radio Waves

Wavelength. Radio waves are similar to ocean waves in that both have regularly spaced high and low points. The distance between the same point (crest, as an example) on two identical successive waves is the length of the wave, which is called the wavelength.

Radio Wave Speed. Radio and light waves travel at about 299,796,000 meters per second. Since one meter equals approximately 39.37 inches, radio-wave velocity is also about 983,630,676 feet per second. Since a statute mile is 5280 feet, radio-wave velocity is also about 186,293 statute miles per second. For the sake of simplicity, radio-wave velocity is accepted as being 300 million meters, or 186 thousand miles, per second.

This is Alex Della Casa, I4YNO, of Modena, Italy. He operates the 15 meter Novice band. Alex enjoys being the first Italian contact for U.S.A. Novices, and he does send QSL cards.

Frequency-To-Wavelength Relationship. The preceding information makes it apparent that the following relationships exist:

$$\lambda = \frac{300{,}000{,}000}{f} \text{ and } f = \frac{300{,}000{,}000}{\lambda}$$

$$\lambda = \frac{300{,}000}{f(kHz)} \text{ and } f(kHz) = \frac{300{,}000}{\lambda}$$

$$\lambda = \frac{300}{f(MHz)} \text{ and } f(MHz) = \frac{300}{\lambda}$$

where:

300,000,000 meters per second is used as radio wave speed;
λ is wavelength in meters;
f is frequency in Hertz per second, which was previously called cycles per second;
f(kHz) is frequency in kilohertz, which is thousands of Hertz per second;
f(MHz) is frequency in megahertz, which is millions of Hertz per second.

Selecting Listening Frequencies

Shortwave Broadcast Bands. The major international shortwave amplitude modulation (a.m.) broadcast bands are listed in Table II. Usage varies a bit between the three ITU (International Telecommunications Union) regions, but broadcasts can usually be heard in all regions of the world. ITU Region I is Europe and Africa. ITU Region II is North, Central, and South Americas. ITU Region III is Asia, Australasia, and everything else south of the Equator, except Africa and South America. International shortwave broadcast bands are usually referred to by using a convenient whole-number meter point. As an example, the 4750 to 5060 kilohertz spectrum is actually the 59.3 to 63.2 meter band, but it is called the 60 meter band.

Band Limits

Band Designation (Meters)	Meters	Megahertz
11	11.5–11.7	25.60–26.10
13	13.8–14.0	21.45–21.75
16	16.8–17.0	17.70–17.90
19*	19.4–19.9	15.10–15.45
25*	25.1–25.6	11.70–11.975
31*	30.7–31.6	9.50–9.775
41	41.1–42.3	7.10–7.30†
49	48.4–50.4	5.95–6.20
60	59.3–63.2	4.75–5.06
75	75.0–76.9	3.90–4.00†
90	88.2–93.8	3.20–3.40
120	120.2–130.4	2.30–2.495

*Approximately half of all international broadcasting activities are on the 19, 25, and 31 meter bands.
†*Used by amateurs in the Americas.*

Table II– International amplitude modulation shortwave broadcast bands.

Domestic Broadcast Bands. The U.S.A. broadcast bands are as follows: Amplitude Modulation (a.m.) broadcasting: 535–1605 kHz. Frequency Modulation (f.m.) broadcasting: 88–108 MHz. Television broadcasting: 54–72 MHz, 76–88 MHz, 174–216 MHz, 470–890 MHz.

Photographs Wanted

Black-and-white photographs of Novices in their shacks are frequently included in this column. The size of the submitted photograph is unimportant but it must have reasonably good definition, contrast, and subject matter. Color pictures can be used, but black-and-white photographs are preferred. A brief summary of operating activities and achievements, plus a personal self-introduction, are needed with each picture. Photographs are not returned unless they are accompanied by a request for their return, plus a self-addressed and stamped envelope. A free one-year *CQ* renewal or new subscription (please state which) is awarded to the amateur who sends the picture I select as the winner for the month. If you are a current *CQ* subscriber, please state that this is the case and enclose the mailing label taken from a recent issue of *CQ*, or a copy of the exact information on that address label. One award is made each month, no matter how many photographs are printed. I have never received a photograph from a Novice in Arkansas, Connecticut, Hawaii, Kentucky, Louisiana, Montana, Nebraska, Nevada, New Hampshire, Oregon, Rhode Island, South Carolina, Tennessee, Utah, Vermont, Washington, West Viriginia, or Wyoming. If you are an active Novice in one of the 18 states listed in the preceding sentence, I hope you will take the time to send a good photograph. Photographs and accompanying captions provide a greatly appreciated introduction to a few of the newer amateurs.

73, Bill, W6DDB

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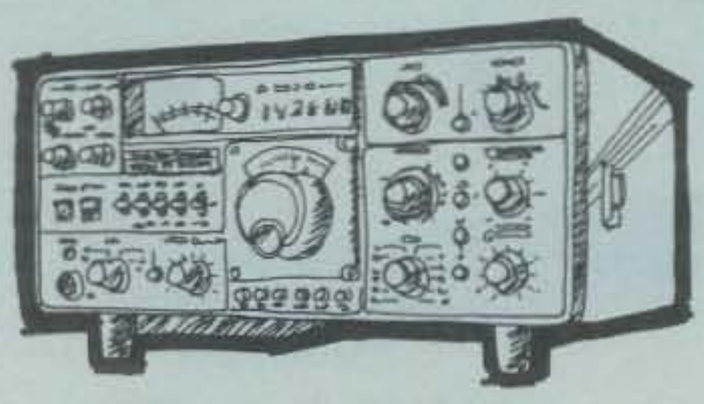

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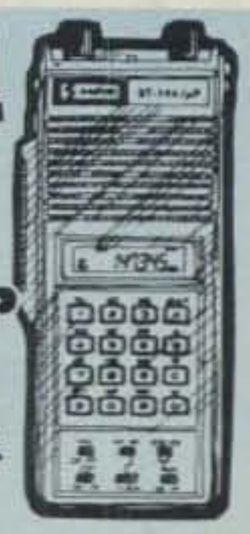

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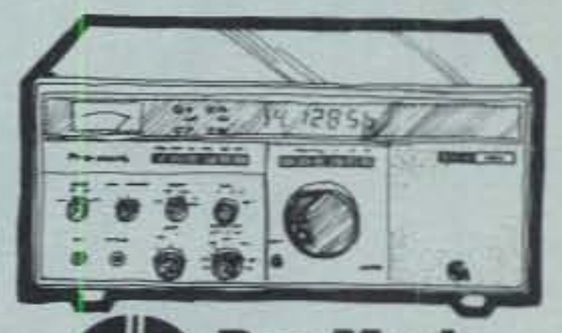

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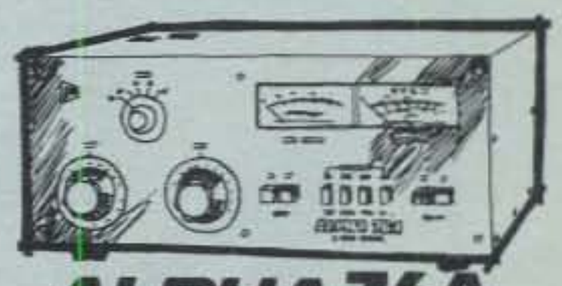

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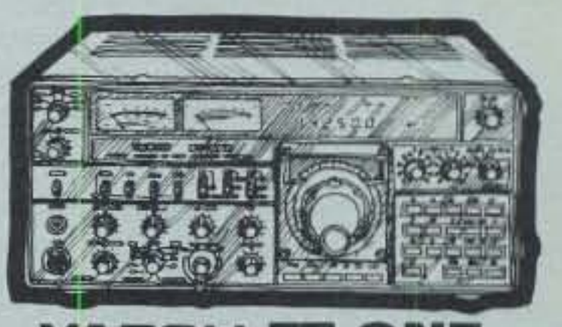

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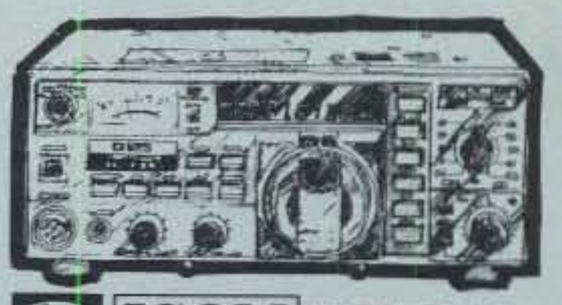

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CIRCLE 73 ON READER SERVICE CARD

Though the mystique surrounding Collins gear persists, there are hearty souls who do indeed repair, modify and improve this equipment on a regular basis. K9ARZ takes us one step at a time through one of these repairs.

Mechanical Repair of Collins S-Line Receiver/Transceiver Preselector Assemblies

BY LAWRENCE W. STARK*, K9ARZ

If you are a Collins S-Line owner, you have no doubt peeked under the lift-cover of your rig from time to time in order to make adjustments. While viewing the inside of your receiver or transmitter, you probably have noticed the construction of the preselector/exciter tuning-slug rack-assembly. It is located just above the bandswitch of all units. An examination of the assembly will reveal a cylinder, some pulleys, and a rack which holds the cores of the permeability tuned coils which tune the r.f. circuits of the associated unit. The rack moves up and down as the vernier driven cylinder tunes, through the use of thin copper alloy bands that function as belts.

The first time I had my 75S-3 out of the cabinet, I noticed the copper bands and wondered what I would ever do if they became broken. Well, one day while making an adjustment to the bearings of the assembly, the rear band became kinked and later broke. Knowing how expensive replacement parts can be for Collins gear, I almost panicked. One problem with a broken band is that the band is riveted to the slug rack. It could be difficult to replace just the band without putting in a completely new slug rack. Several calls were made to individuals who occasionally deal in used Collins parts from cannabalized units. Nowhere was a slug rack to be found. In desperation, I called Western Nebraska Electronics[1] and Dennis Brothers, the proprietor, indicated that all was not hopeless, but a new rack might cost around $75.00. He also indicated that he could make me a new band and if I carefully drilled out the rivet holding the old one, a new one could be mounted in place with a small machine belt and nut. I promptly sent off a money order for the new band hoping to receive it in time for the next DX contest.

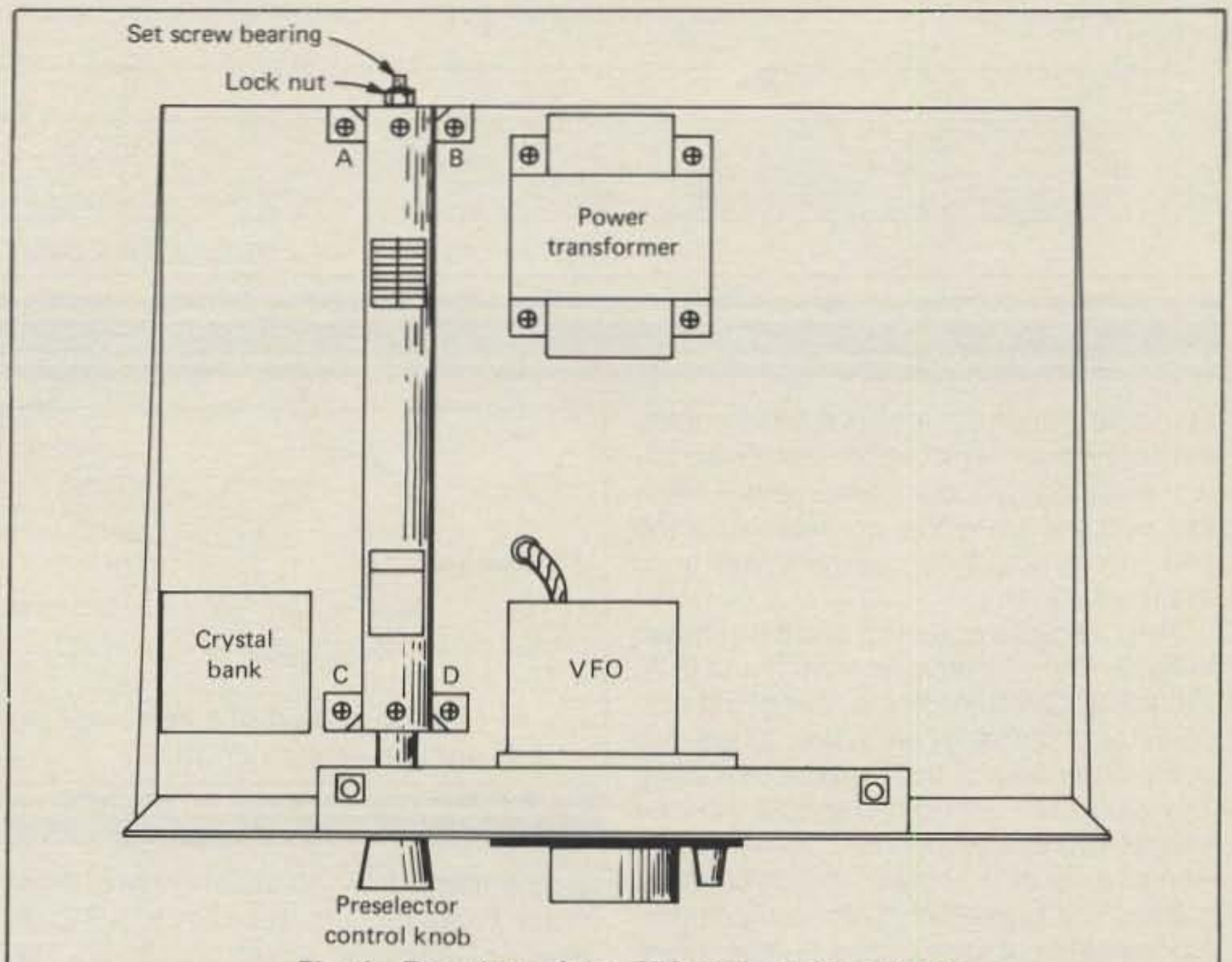


Fig. 1– Top view of the 75S series of receivers.

In the meantime, I began to worry that the new band would not arrive in time, so I set out to manufacture my own. Not having any copper on hand, several other types of metal alloys were tried without success. Only copper or copper-alloy has the proper degree of maleability and resistance to breakage.

Removal Of The Slug Rack Assembly

Before manufacturing a new band, the old one has to be removed. This entails the removal of the entire preselector assembly. The process is quite simple. First, remove the unit from the cabinet by removing the four rubber feet and the three retaining screws (two just under the lid and one on the bottom between the rear feet). Carefully slide the unit out of the cabinet. Once on the bench, refer to

*1320 Fox Glade Court, St. Charles, IL 60174

[1]*Western Nebraska Electronics (Collins Authorized Service Center), Dennis L. Brothers Propr., Route 1, Box 1, Potter, NE 69156.*

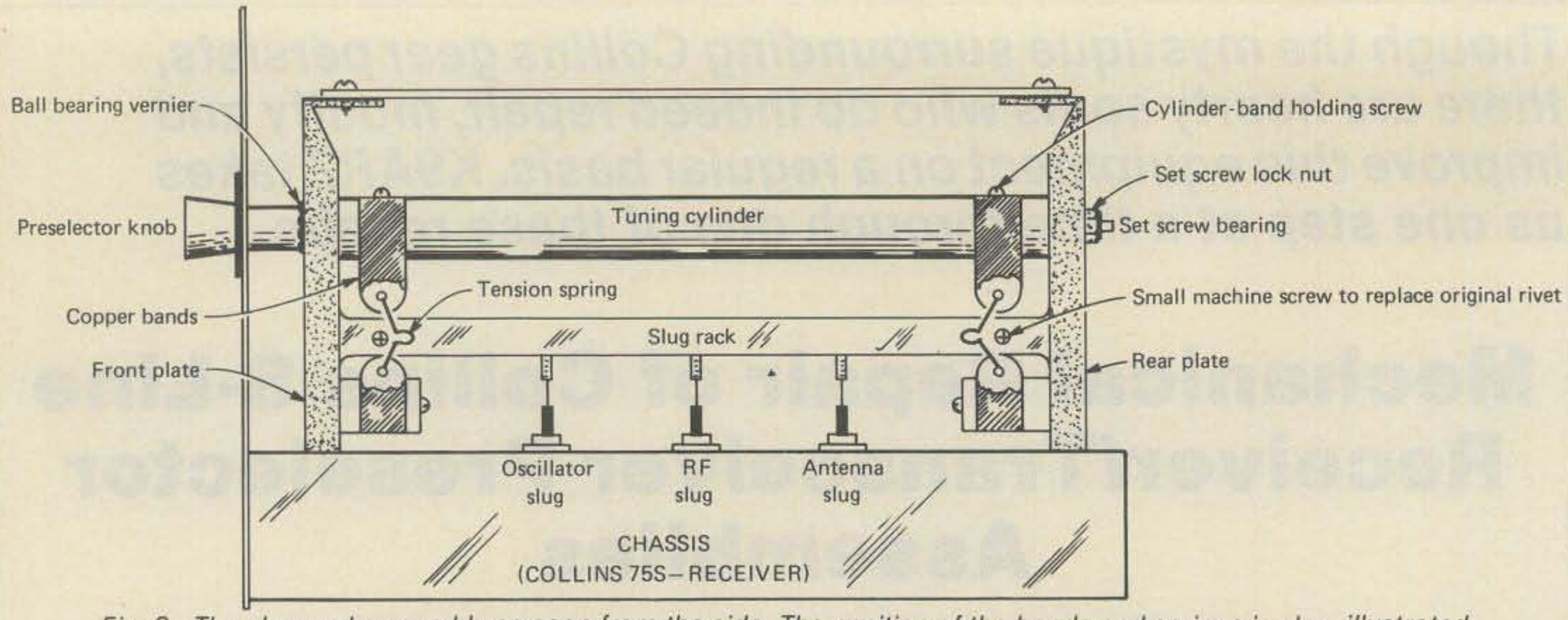
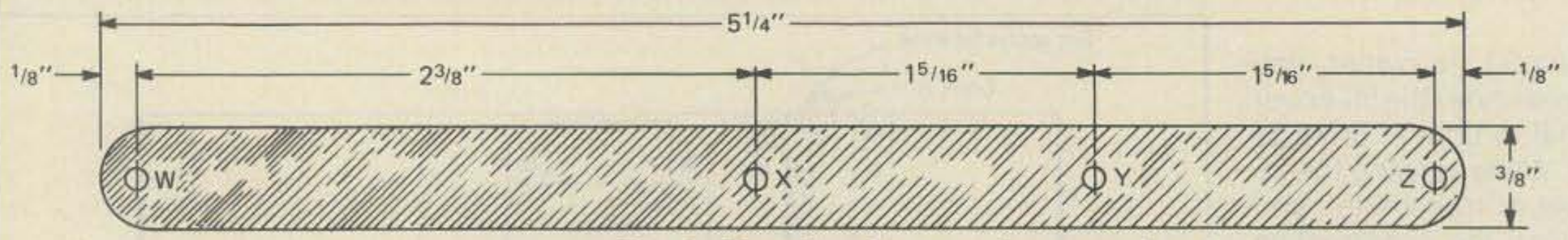


Fig. 2– The slug rack assembly as seen from the side. The position of the bands and springs is also illustrated.



Template of copper band for slug rack assembly of Collins S-line receiver or transmitter

Fig. 3– Template for a replacement band.

fig. 1 and loosen the lock nut, which holds the screw bearing, counter-clockwise until the tuning cylinder hangs loose. With the cylinder free, the preselector knob and vernier shaft can be removed from the front panel.

Next, remove screws **A** and **B** as shown in fig. 1. Then remove screws **C** and **D**. At this point, carefully lift the rear of the preselector assembly until the slugs are completely free of their respective coils. The slug rack assembly should now be easy to remove completely from the unit. Remove the small screw and lockwasher holding the broken band to the cylinder. Taking care not to destroy any other hardware, the rivet holding the broken band to the slug rack can be drilled out. Be sure to save the spring clips which are used to put tension on the bands. Fig. 2 shows the slug rack assembly from a side view and the position of the bands and springs is also illustrated.

With the broken band removed from the receiver, the pieces are loosely reassembled, and a template can be made to facilitate the manufacture of a new band. See fig. 3 for a template.

Making A New Band

Having struck-out by using non-copper alloys, the decision was made to try to locate some thin brass shim stock. A local hobby shop fortunately carried a complete stock of brass material. The material selected is from an assortment of shim brass #258, manufactured by K & S Engineering Company[2], which cost $1.20. The assortment contains several sizes and thicknesses of shim stock. The thickness which most closely resembles the original band should be selected. Using the template, cut out the band with a pair of scissors (not the XYL's sewing scissors) and *punch* holes at locations **W, X, Y,** and **Z** as shown in fig. 3. Make sure that hole **Y** is located off-center as shown on the template.

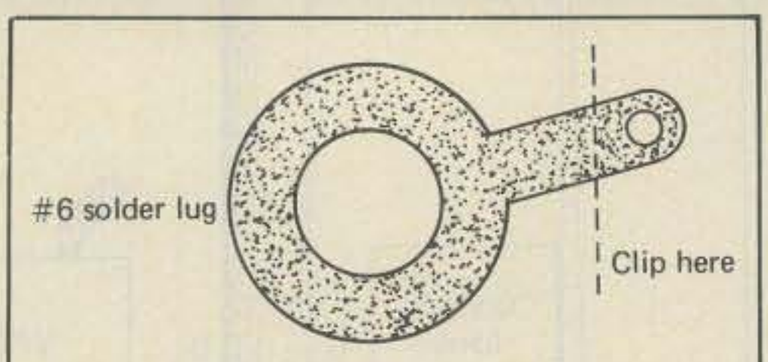


Fig. 4– Clip the end off of a #6 solder lug for use as a strain relief.

When working with brass/copper shim stock, use extreme caution when cutting and punching the material. *Never use a drill* to make holes in the material. Twist drills will cause the copper to wrap around them and serious cuts can be the undesired result. A nail set or center punch is much safer and more effective, and your hands will go unscathed.

The original band had eyelet rivets on the ends in order to take the strain off the soft beryllium-copper alloy. In lieu of rivets, lightly solder the clipped ends of a solder lug over the holes at the ends of the band. It may be necessary to tin the ends first. See figures 4 and 5. Use a 25 watt or less soldering pencil for this task.

Cleaning The Vernier Parts

Before reassembling the preselector, I would recommend that the large ball bearings located at the front of the assembly and the one small bearing at the rear of the assembly be removed and all parts be soaked in a mild degreasing solvent and thoroughly dried. Then repack all bearings with fresh silicon grease. After reassembly, you will find that the preselector will turn almost as easily as a gain pot.

Reassembly

Reassembly is not much more difficult than the disassembly although your patience may be tried. Once the newly manufactured band has been bolted onto the slug rack, you may proceed to replace the four large bearings at the vernier end of the tuning cylinder. A generous but not

[2]*K & S Engineering Company, Chicago, Illinois 60668 (available at any good hobby shop).*

Say You Saw It In CQ

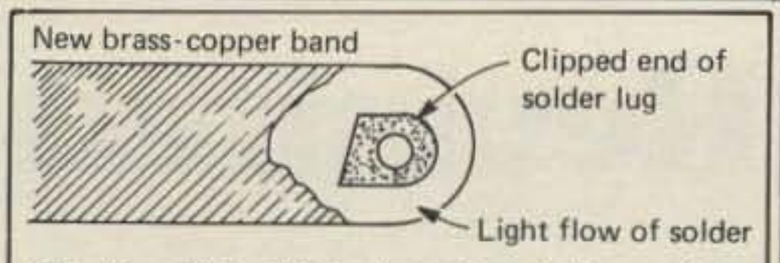


Fig. 5– The clipped ends of the solder lugs are carefully soldered to the ends of the new band over holes W and Z and act as strain reliefs for the soft metal.

a messy amount of new silicon grease should suffice to hold the bearings in place until final assembly. The next step would be to insert the vernier end of the cylinder through the large hole in the front plate of the assembly (see fig. 3). With the cylinder loosely in place (the rear set screw bearing not yet tightened) it should be possible to replace the tuning assembly back into the unit. Carefully slip the individual slugs into their respective coils as you position the front and rear plates over their mounting holes. When all is in position, replace screws **A, B, C,** and **D** and tighten them. It may be necessary to loosen these later and shift the whole assembly if there is any tension on the slugs as they are raised and lowered in their coils.

Next, reinsert the preselector knob with its vernier shaft into the cyliner where the large ball bearings are located. Now comes the difficult part of the operation; with the tuning cylinder still hanging loose, you must replace the tension springs to the ends of the copper bands which have already been refastened to both the cylinder and the slug rack. Care must be observed not to bend, kink, or damage the new or old bands or we regress back to square one. I'm sure there must be a special tool which Collins uses for this purpose. One must be nimble and patient during this operation if one doesn't have the tool. Once the springs are in place, the rest is easy. All that is left is to gently lift the rear end of the cylinder until it is aligned with the rear set-screw bearing and tighten the set screw until the proper action is felt on the preselector control knob. Under-tightening of this screw will result in slippage; over-tightening will make the control turn very hard and may damage the set-screw bearing. If all bearings have been properly lubricated, the proper adjustment will be arrived at when all slippage disappears.

Results

Now that the unit tunes smoothly again, you may find like I did that the r.f. circuits could use some "touching up." Refer to your Collins owner's manual for these steps and I think you will be pleasantly surprised at how much better the receiver/transceiver functions with a little effort. This procedure has been applied to both my 75S3 and 75S1, but also applies to the KWM-2 and 32S series.

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The Countries List Revisited

BY JOHN A. ATTAWAY*, K4IIF

In the October 1972 issue, page 81, *CQ* published an article by K4IIF entitled "These Things We Call Countries, What Are They?" This article was written partly as an aid to DXers in explaining the over 300 countries on the ARRL Countries list to non-DXers and non-amateurs, and partly as an independent examination of the criteria used to define countries for DX Award purposes. *CQ* bases its own Countries Awards, the C.W. DX Award and the S.S.B. DX Award, on the A.R.R.L. Countries List.

Almost 10 years have gone by since we researched the original article, and Dick Ross, K2MGA, *CQ*'s intrepid publisher, indicated that a new article looking at the changes in the list and in DX country philosophy over the past decade would be in order.

There continues to be a wide disparity today, both in size and population, of the amateur radio countries. They vary in area from the almost 5,000,000 square miles making up the Asiatic Russian Soviet Federated Socialist Republic (Siberia) to the 0 square miles of I.T.U., Geneva, and the United Nations, New York, and in population from the almost 1 billion people of the Peoples Republic of China to the totally uninhabited islands such as Aves, Bajo Nuevo, Clipperton, Desecheo, Kingman Reef, Malpelo, Navassa, Serrana Bank, and others. However, some of the uninhabited (and uninhabitable) spots such as Minerva Reef, Blenheim Reef, and Geyser Reef, which are not administered by any government, have now been deleted from the active list.

The deletion of unadministered areas is one of the major changes which the League has made in the Countries List since 1972. The official Countries List Criteria, quoted directly from the official ARRL DXCC List, are as follows:

Countries List Criteria

The ARRL Countries List is the result of some 38 years of progressive changes in DXing. The full list will not necessarily conform completely with these criteria since some listings were set up and recognized from pre-WWII. While the general policy has remained the same, specific mileages and additional points have, over the past 17 years, been added to the criteria. The specific mileages in Point 2(a) and Point 3, mentioned in the following, have been used in considerations made in April 1960, and after. The specific mileage in Point 2(b) has been used in considerations made in April, 1963, and after.

Any land area in the world, with the exception of such land that would come under Points 4 and 5, can be placed in one or more of the following categories. Where the area in question meets at least one of the points in the criteria it may be considered eligible as a separate entity, i.e. a country, for our Countries List.

1) *Government:* An area by reason of Government constitutes a separate entity.

2) *Separation by water:* An island or a group of islands, not having its own government, is considered as a separate entity under the following conditions:

(a) Islands situated off shore from their governing area must be geographically separated by a minimum of 225 miles of open water. This point is concerned with islands off shore from the mainland *only*. This point *is not* concerned with islands which are part of an island group or are geographically located adjacent to an island group.

(b) Islands forming part of an island group or which are geographically located adjacent to an island, or island group, which have a common government, will be considered as separate entities provided there is at least 500 miles of open water separation between the two areas in question.

3) *Separation by foreign land:* In the case of a country, such as that covered by Point 1, which has a common government but which is geographically separated by land which is foreign to that country, if there is a complete separation of the country in question by a minimum of 75 miles of foreign land, the country is considered as two separate entities. This 75 miles of land is a requirement which is applicable to land areas *only*. In cases of areas made up of a chain of islands, there are no minimum requirements concerned with the separation by foreign land.

4) *Unadministered area:* Any area which is unadministered will not be eligible for consideration as a separate entity.

5) (a) Any area which is classified as a Demilitarized Zone, Neutral Zone or Buffer Zone will not be eligible for consideration as a separate entity.

(b) Embassies, consulates and extraterritorial monuments will not be eligible for consideration as a separate entity from the host country.

Of these criteria, numbers 4 and 5 have been added since 1972. Criteria 4 led to the deletion of Minerva, Blenheim, and Geyser Reefs, as mentioned above, while criteria 5 led to the deletion of the Kuwait/Saudi Arabia Neutral Zone, although the Saudi Arabia/Iraq Neutral Zone remains on the list as of the date of this writing.

Another major change involves the status of the Federal Republic of Germany and the German Democratic Republic. Prior to Sept. 17, 1973, these were treated as one country, but today they are recognized as separate countries. However, in a related situation, the Republic of Korea (South Korea) and the Democratic People's Republic of Korea (North Korea) are still treated as one country.

For us old timers, the Countries List always began with AC3–Sikkim, AC4–Tibet and AC5–Bhutan, and it doesn't seem right without them. However, Sikkim is now considered part of India, AC4 is part of China, and AC5 has just become A5. Other old stalwarts now gone the way of a changing world are KS4–Swan Island, now a possession of Honduras and no longer eligible for separate country status, and KZ5–Canal Zone, now part of Panama.

In the preamble to the criteria it is pointed out that "the specific mileages in Point 2(a) and Point 3 have been used in considerations made April, 1960 and after. The specific mileage in Point 2(b) is being used in considerations made in and after April, 1963." Therefore the full list does not conform to these specific criteria, some countries being traditionally listed since before World War II. Examples are Corsica and the Balearic Islands, a Department of Metropolitan France and a Province of Spain, respectively, which are considered separate entities even though they are much less than 225 miles off shore as required by 2(a).

In the 1972 article we divided the countries into 5 classes depending on the degree to which each of them possessed the attributes of area, population, and governmental system which the world community requires of a country. A sixth class was added for deleted countries, but we are eliminating this class. The 5 classes of countries are defined as follows:

Class 1 Country - Generally recognized as a complete and independent country by the world community.

Class 2 Country - A fully developed entity with most of the characteristics of a Class 1 Country. Most Class 2 Countries may be described as either states, associated states, provinces, departments, or as Soviet Socialist Republics.

Class 3 Country - An entity with the necessary area and population to become a Class 1 or 2 Country after it matures economically and/or politically. Many Class 3 Countries have Territorial type governments with varying degrees of local rule.

Class 4 Country - An entity with sufficient area and/or population to become a Class 1 or 2 Country, but which has very little potential to actually move up the ladder. Many Class 4 Countries are islands too barren and inhospitable to support a permanent population.

(Text continued on page 75.)

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Say You Saw It In CQ

Prefix	Country	Continent	Form of Government	Area in Square Miles	Permanent Population	Class of Country	Zone
A2, ZS9	Botswana	AF	Republic	231,805	800,000	1	38
A3	Tonga	OC (21°S, 175°W)	Constitutional Monarchy	270	100,000	1	32
A4	Oman	AS	Sultanate	82,029	900,000	1	21
A5, AC5	Bhutan	AS	Monarchy	18,147	1,300,000	1	22
A6	United Arab Emirates	AS	Emirate	32,278	800,000	1	21
A7	Qatar	AS	Emirate	4,402	200,000	1	21
A9X (A9Z)	Bahrain	AS	Emirate	258	400,000	1	21
AP	Pakistan	AS	Republic	310,403	86,500,000	1	21
BV	Taiwan	AS	Republic	13,885	17,800,000	1	24
BY	China	AS OC	Communist[1]	3,691,523	975,000,000	1	23, 24
C2, VK9	Nauru	(0°, 166°E)	Republic	8	7,000	1	31
C3, PX	Andorra	EU	Co-Principality[2]	175	24,000	1	14
C5, ZD3	The Gambia	AF	Republic	4,361	600,000	1	35
C6, VP7	Bahamas	NA	Commonwealth	5,382	200,000	1	8
C9, CR7	Mozambique	AF	Peoples Republic	302,330	10,300,000	1	37
CE	Chile	SA	Republic	292,258	11,300,000	1	12
CE9, FB8, KC4 LA, LU, OR4, UA1, VKØ, VP8, ZL5, ZS1, 3Y, 4K, 8J	Antarctica	Antarctica	12 Nation Treaty	5,100,000	0[3]	3	12, 13, 38, 39, 29, 30, and 32
CEØA	Easter Island	SA (27°S, 109°W)	Administered by Chile	63	1,598	3	12
CEØX	San Felix & San Ambrosia Islands	SA (26°S, 80°W)	Administered by Chile	3	0	4	12
CEØZ	Juan Fernandez Island	SA (33°S, 79°W)	Administered by Chile	56	615	3	12
CM, CO	Cuba	NA	Communist	44,218	10,000,000	1	8
CN	Morocco	AF	Constitutional Monarchy	172,414	21,000,000	1	33
CP	Bolivia	SA	Republic	424,163	5,300,000	1	10
CR9	Macao	AS (22°N, 114°E)	Provincial[4]	6	270,000	2	24
CT1	Portugal	EU	Corporative Republic	34,309	9,900,000	1	14
CT2	Azores Islands	EU (38°N, 28°W)	Provincial[4]	893	330,000	2	14
CT3	Madeira Islands	AF (33°N, 17°W)	Provincial[4]	308	275,000	2	33
CX	Uruguay	SA	Republic	72,173	2,929,006	1	13
D2, 3	Angola	AF	People's Republic	481,354	6,700,000	1	36
D4	Rep. of Cape Verde	AF (16°N, 24°W)	Republic	1,557	300,000	1	35
D6	Comoros	AF (12°S, 45°E)	Islamic Republic	838	300,000	1	39
DA, DF, DJ, DK, DL	Fed. Republic of Germany	EU	Republic	95,961	61,100,000	1	14
DM, Y2–Y9	German Democratic Republic	EU	Communist	41,767	16,700,000	1	14
DU, DX	Philippines	OC	Republic	115,830	47,700,000	1	27
EA	Spain	EU	Monarchy	194,984	37,800,000	1	14
EA6	Balearic Islands	EU (39°N, 4°E)	Provincial[5]	1,936	530,000	2	14
EA8	Canary Islands	AF (28°N, 16°W)	Provincial[6]	2,208	950,000	2	33
EA9	Cueta & Melilla	AF	Part of Metropolitan Spain[7]	82	155,000	3	33
EI	Ireland	EU	Republic	27,136	3,330,000	1	14
EL	Liberia	AF	Republic	43,000	1,900,000	1	35
EP	Iran	AS	Constitutional Monarchy	623,293	38,500,000	1	21
ET	Ethiopia	AF	Military	471,776	32,600,000	1	37
F	France	EU	Republic	211,207	53,600,000	1	14
FB8W	Crozet Islands	AF (46°S, 52°E)	Territorial[8]	60	0[9]	4	39
FB8X	Kerguelen Islands	AF (49°S, 70°E)	Territorial[8]	2,700	0[9]	3	39
FB8Z	Amsterdam & St. Paul Islands	AF (38°S, 78°E)	Territorial[8]	38	0[9]	4	39
FC	Corsica	EU	Departmental[10]	3,368	280,000	2	15
FG7	Guadeloupe	NA (16°N, 61°W)	Departmental[11]	687	350,000	2	8
FG, FS	St. Martin	NA (18°N, 63°W)	Administered from Guadeloupe	20	6,000	3	8
FH	Mayotte	AF (13°S, 45°E)	Territory[8]	-	-	3	39
FK8	New Caledonia	OC (22°S, 166°E)	Territorial[8]	7,300	110,000	3	32
FM7	Martinique	NA (15°N, 61°W)	Departmental[11]	425	360,000	2	8
FO8	Clipperton Island	NA (10°N, 109°W)	Administered from French Polynesia	2	0	4	7
FO8	French Polynesia	OC (18°S, 148°W)	Territorial[8]	1,500	110,000	3	32
FP8	St. Pierre & Miquelon Islands	NA (47°N, 56°W)	Territorial[8]	93	5,000	3	5
FR	Glorioso Islands	AF (12°S, 47°E)	Administered from Reunion Is.	1	0	4	39
FR	Juan de Nova Island & Europa	AF (16°S, 43°E)	Administered from Reunion Island	1	0	4	39
FR	Reunion Island	AF (21°S, 55°E)	Departmental[11]	969	472,000	2	39
FR	Tromelin Island	AF (16°S, 54°E)	Administered from Reunion Island	-	0	4	39
FW8	Wallis & Futuna Islands	OC (13°S, 177°W)	Territorial[8]	106	9,900	3	32
FY7	French Guiana	SA	Departmental[11]	35,135	43,000	2	9
G	England[12]	EU	Constitutional Monarchy	50,332	50,000,000	1	14
GD	Isle of Man	EU (54°N, 5°W)	Self-governing Dependency of U.K.	227	50,000	2	14
GI	Northern[12] Ireland	EU	Constitutional Monarchy	5,462	1,600,000	1	14
GJ, GC	Jersey[13]	EU	Self-governing Dependency of U.K.	45	64,500	2	14
GM	Scotland[12]	EU	Constitutional Monarchy	30,514	5,500,000	1	14
GU, GC	Guernsey & Dependencies	EU	Self-governing Dependency of U.K.	24	45,000	2	14
GW	Wales[12]	EU	Constitutional Monarchy	8,016	2,774,000	1	14
H4, VR4	Solomon Islands	OC (10°S, 160°E)	Parliamentary	11,500	200,000	1	28
HA, HG	Hungary	EU	Communist	35,919	10,800,000	1	15
HB	Switzerland	EU	Federal Republic	15,941	6,353,000	1	14
HBØ, HE	Liechtenstein	EU	Principality	61	24,000	1	14
HC	Ecuador	SA	Republic	109,484	8,000,000	1	10
HC8	Galapagos Islands	SA	Administered by Ecuador	2,869	3,000	3	10

Prefix	Country	Continent	Form of Government	Area in Square Miles	Permanent Population	Class of Country	Zone
HH	Haiti	NA	Republic	10,714	5,800,000	1	8
HI	Dominican Republic	NA	Republic	18,816	5,400,000	1	8
HK	Columbia	SA	Republic	439,737	26,700,000	1	9
HKØ	Bajo Nuevo	NA (16°N, 79°W)	Administered by Columbia	0[14]	0	5	8
HKØ	Malpelo Island	SA (4°N, 81°W)	Administered by Columbia	1[15]	0	5	9
HKØ	San Andres & Providencia Islands	NA (13°N, 82°W)	Administered by Columbia	16	8,000	3	7
HL, HM	North Korea[16]	AS	Communist	46,540	19,000,000	1	25
HL, HM	South Korea[16]	AS	Republic	38,022	37,600,000	1	25
HP	Panama	NA	Republic	29,209	1,900,000	1	7
HR	Honduras	NA	Republic	43,277	3,800,000	1	7
HS	Thailand	AS	Constitutional Monarchy	198,457	47,300,000	1	26
HV	The Vatican	EU	Theocracy	0.17[17]	1,000	1	15
HZ, 7Z	Saudi Arabia	AS	Monarchy	830,000	8,200,000	1	21
I, IT	Italy & Sicily	EU	Republic	116,304	57,200,000	1	15
IS, IM	Sardinia	EU	Regional	9,301	1,500,000	2	15
J2, FL8	Djibouti	AF	Parliamentary	8,494	400,000	1	37
J3, VP2G	Grenada & Dependencies	NA (12°N, 61°W)	Parliamentary	133	100,000	1	8
J5, CR3	Guinea-Bissau	AF	Republic	13,948	600,000	1	35
J6, VP2L	St. Lucia	NA (14°N, 61°W)	Parliamentary	238	100,000	1	8
J7, VP2D	Dominica	NA (15°N, 61°W)	Commonwealth	290	100,000	1	8
JA–JN, KA	Japan	AS	Constitutional Monarchy	142,813	116,200,000	1	25
JD, KA1	Minami Torishima[18]	OC (25°N, 154°E)	Administered by Japan	1	0	4	27
JD, KA1	Ogasawara[19]	AS (25°N, 140°E)	Administered by Japan	42	200+	3	27
JT	Mongolia	AS	Communist	604,250	1,700,000	1	23
JW, LA/P	Svalbard	EU (78°N, 17°W)	Administered by Norway	23,957	1,200	4	40
JX, LA/P	Jan Mayen	EU (71°N, 8°W)	Administered by Norway	150	0	4	40
JY	Jordan	AS	Constitutional Monarchy	37,738	3,200,000	1	20
K, W, N, A	United States of America	NA	Republic	3,615,221	226,504,825	1	3, 4,
KB, KH1	Baker and Howland Islands	OC (0°, 177°W)	Administered by US	1	0	4	31
KC4, KP1	Navassa Island	NA (19°N, 75°W)	Administered by US	0.5[20]	0	5	8
KC6	Eastern Caroline Islands[21]	OC (8°N, 145°E)	UN Trust Territory Under US Administration	215	40,000	3	27
KC6	Western Caroline Islands[22]	OC (8°N, 136°E)	UN Trust Territory Under US Administration	232	19,000	3	27
KG4	Guantanamo Bay	NA	US Naval Base in eastern Cuba[23]	-	-	5	8
KG6, KH2	Guam	OC (13°N, 144°E)	Territorial[24]	212	126,000	2	27
KG6R, S, T, KHØ	Marianas Islands[25]	OC	UN Trust Territory under US administration	184	10,000	3	27
KH6	Hawaiian Islands	OC	State	6,450	920,000	2	31
KH7	Kure Island[26]	OC (28°N, 178°W)	Administered by US[35]	1	0	5	31
KJ6, KH3	Johnston Island	OC (17°N, 170°W)	Administered by US	1	156	4	31
KL7	Alaska	NA	State	586,412	405,000	2	1
KM6, KH4	Midway Island	OC (28°N, 177°W)	Administered by US	2	2,356	3	31
KP4	Puerto Rico	NA	Commonwealth[27]	2,435	3,500,000	2	8
KP4	Desecheo	NA (19°N, 67.5°W)	Administered by US	2	0	5	8
KP6, KH5K	Kingman Reef	OC (7°N, 163°W)	Administered by US	½	0	5	31
KP6	Palmyra & Jarvis Island	OC (5°N, 162°W)	Administered by US	6	0	4	31
KS4B, KP3, HKØ	Serrana Band & Roncador Cay	NA (14°N, 80°W)	Administered by US and Columbia	½	0	5	7
KS6, KH8	American Samoa	OC (14°S, 170°W)	Territorial[28]	76	26,000	3	32
KV4, KP2	US Virgin Islands	NA (18°N, 65°W)	Territorial[29]	133	95,214	2	8
KW6, KH9	Wake Island	OC (19°N, 166°E)	Administered by US	3	1,097	3	31
KX6	Marshall Islands	OC (10°N, 170°E)	UN Trust Territory under US Administration[30]	70	18,925	3	31
LA, LB, LF, LG, LJ	Norway	EU	Constitutional Monarchy	125,182	4,100,000	1	14
LU	Argentina	SA	Republic	1,072,073	27,100,000	1	13
LX	Luxembourg	EU	Constitutional Monarchy	998	400,000	1	14
LZ	Bulgaria	EU	Communist	42,823	8,900,000	1	20
OA	Peru	SA	Republic	496,225	17,600,000	1	10
OD5	Lebanon	AS	Republic	4,015	3,200,000	1	20
OE	Austria	EU	Republic	32,374	7,460,000	1	15
OH, OF	Finland	EU	Republic	130,120	4,773,000	1	15
OHØ	Aland Islands	EU (60°N, 20°E)	Provincial[31]	570	21,000	2	15
OJØ	Market Reef[32]	EU (60°N, 19°E)	Administered by Finland	1	0	5	15
OK	Czechoslovakia	EU	Dictatorship	49,371	15,400,000	1	15
ON	Belgium	EU	Constitutional Monarchy	11,781	9,900,000	1	14
OX, XP	Greenland	NA	Provincial[33]	840,000	54,000	2	40
OY	Faeroe Islands	EU (62°N, 7°W)	Territorial[34]	540	39,000	2	14
OZ	Denmark	EU	Constitutional Monarchy	16,629	5,100,000	1	14
P2	Papua New Guinea	OC	Parliamentary	178,260	3,200,000	1	28
PA, PD, PE, PI	Netherlands	EU	Constitutional Monarchy	13,961	14,100,000	1	14
PJ	Netherlands Antilles[35]	SA	Territorial[36]	337	200,000	3	9
PJ	St. Maarten, Saba, & St. Eustatius	NA	Territorial[36]	34	20,000	3	8
PY	Brazil	SA	Republic	3,286,488	122,000,000	1	11
PYØ	Fernando de Noronha	SA (4°S, 32°W)	Territorial (Brazilian)	10	3,000	3	11
PYØ	St. Peter & St. Paul Rocks	SA (1°N, 29°W)	Administered by Brazil	1/100	0	5	11
PYØ	Trinidade & Martin Vaz Islands	SA (20°S, 29°W)	Administered by Brazil	4	0	4	11
PZ	Surinam	SA	Parliamentary	63,039	416,000	3	9
S2	Bangladesh	AS	People's Republic	55,126	90,600,000	1	22
S7, VQ9	Seychelles	AF (4°S, 56°E)	Republic	145	100,000	1	39
S9, CR5	Sao Tome & Principe	AF	Democratic Republic	372	100,000	1	35
SK, SL, SM	Sweden	EU	Constitutional Monarchy	173,666	8,300,000	1	14

Prefix	Country	Continent	Form of Government	Area in Square Miles	Permanent Population	Class of Country	Zone
SP, 3Z	Poland	EU	Communist	120,665	35,500,000	1	15
ST2	Sudan	AF	Republic	967,500	18,200,000	1	34
STØ	Southern Sudan	AF	-	-	-	3	34
SU	Egypt	AF	Republic	386,662	42,100,000	1	34
SV	Crete	EU	Departmental (Greek)	3,217	483,258	2	20
SV	Dodecanese Islands, Inc. Rhodes	EU	Departmental (Greek)	1,028	123,021	2	20
SV	Greece	EU	Constitutional Monarchy	50,944	9,600,000	1	20
SV	Mount Athos	EU	Theocracy	206	2,700	1	20
T2, VR8	Tuvalu	OC	Parliamentary	9.5	10,000	1	31
T31, VR1	Central Kiribati (Brit. Phoenix Islands)	OC (5°S, 172°E)	Republic	34	1,000	2	31
T30, VR1	West Kiribati (Gilbert & Ocean Is.)	OC (0°, 174°E)	Republic	342	52,000	2	31
T32, VR3	East Kiribati (Line Island)	OC (2°N, 157°W)	Republic	200	1,000	2	31
TA	Turkey	EU & AS	Republic	301,382	36,144,000	1	20
TF	Iceland	EU	Republic	39,769	228,000,000	1	40
TG	Guatemala	NA	Republic	42,042	7,000,000	1	7
TI	Costa Rica	NA	Republic	19,575	2,200,000	1	7
TI9	Cocos Island	NA (6°N, 87°W)	Administered by by Costa Rica	10	0	4	7
TJ	Cameroun	AF	Republic	183,569	8,500,000	1	36
TL	Central African Republic	AF	Republic	240,535	2,200,000	1	36
TN	Congo Republic	AF	Republic	132,047	1,600,000	1	36
TR	Gabon Republic	AF	Republic	103,347	600,000	1	36
TT	Chad Republic	AF	Republic	495,755	4,500,000	1	36
TU	Ivory Coast	AF	Republic	124,504	8,000,000	1	35
TY	Benin	AF	Republic	43,484	3,600,000	1	35
TZ	Mali Republic	AF	Republic	478,767	6,600,000	1	35
UA, UK, UV, UW, UN1, 3, 4, 6	European Russian SFSR	EU	Communist	1,544,632	100,000,000[37]	1	16
UA1	Franz Josef Land	EU	Administered by Russia	8,000	0	4	40
UA2, UK2F	Kaliningradsk	EU	Regional[38]	5,361	620,000	3	16
UA, UK, UV, UW9, Ø	Asiatic Russian SFSR	AS	Regional	4,956,868	25,000,000	3	17, 18, 19 & 23
UB, UK, UT, UY5	Ukranian SSR	EU	Communist SSR[39]	233,090	45,966,000	2	16
UC2, UK2A/C/I/L/O/S/W	Belorussian SSR (White Russia)	EU	Communist SSR[39]	80,155	8,744,000	2	16
UD6, UK6C/D/K	Azerbaidzhan	AS	Communist SSR[39]	33,436	4,802,000	2	21
UF6, UK6F/O/Q/V	Georgia	AS	Communist SSR[39]	26,911	4,611,000	2	21
UG6, UK6G	Armenia	AS	Communist SSR[39]	11,500	2,253,000	2	21
UH8, UK8H	Turkoman	AS	Communist SSR[39]	188,456	1,966,000	2	17
UI8, UK8I	Uzbek	AS	Communist SSR[39]	173,592	10,896,000	2	17
UJ8, UK8J/R	Tadzhik	AS	Communist SSR[39]	55,251	2,654,000	2	17
UL7, UK7L	Kazak	AS	Communist SSR[39]	1,048,306	12,413,000	2	17
UM8, UK8M/N	Kirghiz	AS	Communist SSR[39]	76,641	2,749,000	2	17
UO5, UK5O	Moldavia	EU	Communist SSR[39]	13,012	3,425,000	2	16
UP2, UK2P/B	Lithuania	EU	Communist SSR[39,40]	25,174	3,026,000	2	15
UQ2, UK2Q/G	Latvia	EU	Communist SSR[39,40]	24,595	2,285,000	2	15
UR2, UK2R/T	Estonia	EU	Communist SSR[39,40]	17,413	1,294,000	2	15
VE, VO, VY	Canada	NA	Constitutional Monarchy[42]	3,851,809	24,000,000	1	1, 2, 3, 4, 5
VE1	Sable Island	NA	Administered by Canada	-[41]	-	5	5
VE1	St. Paul Island	NA	Administered by Canada	-[41]	-	5	5
VK, AX	Australia (Inc. Tasmania)	OC	Constitutional Monarchy[42]	2,967,909	14,600,000	1	29, 30
VK	Lord Howe Island	OC (32°S, 159°E)	Administered by Australia[43]	5	265	3	30
VK4, VK9	Willis Island	OC (16°S, 150°E)	Administered by Australia	1	3	4	30
VK9	Christmas Island	OC (10°S, 106°E)	Administered by Australia	55	3,000	3	29
VK9	Cocos Islands (Cocos-Keeling)	OC (12°S, 97°E)	Administered by Australia	5	1,000	3	29
VK9	Mellish Reef	OC	None	0	0	5	30
VK9	Norfolk Island	OC (29°S, 168°E)	Administered by Australia	13	1,000	3	32
VKØ	Heard Island & McDonald Island	AF (54°S, 74°E)	Administered by Australia	140	0	4	39
VKØ	Macquarie Islands	OC (56°S, 159°E)	Administered by Australia[44]	42	0	4	30
VP1, V3	Belize	NA	British Crown Colony[45]	8,867	127,000	2	7
VP2A, V2	Antigua, Barbuda	NA (17°N, 61°W)	Constitutional Monarchy[46]	172	67,000	2	8
VP2E	Anguilla	NA (18°N, 63°W)	Constitutional Monarchy[46]	35	5,500	2	8
VP2K	St. Kitts & Nevis	NA (17°N, 62°W)	Constitutional Monarchy[46]	101	70,000	2	8
VP2M	Montserrat	NA (16°N, 62°W)	British Crown Colony	38	15,000	3	8
VP2S, J8	St. Vincent & Dependencies	NA (13°N, 61°W)	Parliamentary	150	100,000	1	8
VP2V	British Virgin Islands	NA (18°N, 64°W)	British Crown Colony	59	10,000	3	8
VP5	Turks & Caicos Islands	NA (22°N, 72°W)	British Crown Colony	166	6,000	3	8
VP8, LU	Falkland Islands (Islas Malvinas)	SA (52°S, 59°W)	British Crown Colony (Claimed by Argentina)	4,700	2,172	3	13
VP8, LU-Z	South Georgia Islands	SA (55°S, 37°W)	British Administration[47] (Claimed by Argentina)	1,450	1,329	3	13
VP8, LU-Z	South Orkney Islands	SA (61°S, 45°W)	Part of British Antarctic Territories (Claimed by Argentina)	400	0	4	13
VP8, LU-Z	South Sandwich Islands	SA (57°S, 27°W)	British Administration[47] (Claimed by Argentina)	130	0	4	13
VP8, LU-Z	South Shetland Islands	SA (63°S, 60°W)	Part of British Antarctic Territories (Claimed by Argentina)	-	0	4	13
VP9	Bermuda	NA (32°N, 64°W)	British Crown Colony	21	53,000	3	5
VQ9	Chagos Island	AF (7°S, 72°E)	Territorial[48]	60	1,048	3	39
VR6	Pitcairn Island	OC (25°S, 130°W)	Territorial[49]	2	90	3	32
VS5	Brunei	OC	Sultanate	2,226	129,000	1	28
VS6	Hong Kong	AS	British Crown Colony	398	4,204,000	3	24
VS9K	Kamaran Island	AS	Part of Southern Yemen	28	2,200	3	21
VU7	Andaman & Nicobar Islands	AS (10°N, 95°E)	Territorial[50]	3,200	54,000	3	26
VU	India	AS	Republic	1,261,817	676,200,000	1	22
VU7	Laccadive Islands	AS (10°N, 73°E)	Territorial[50]	11	24,000	3	22
XE, XF, 4A, 6D	Mexico	NA	Republic	761,602	68,200,000	1	6
XF4, 6D4	Revilla Gigedo	NA (18°N, 112°W)	Administered by Mexico	320	0	4	6

Prefix	Country	Continent	Form of Government	Area in Square Miles	Permanent Population	Class of Country	Zone
XT	Voltaic Republic (Upper Volta)	AF	Republic	105,869	6,900,000	1	35
XU	Kampuchea	AS	Communist	69,898	6,000,000	1	26
XV5	Vietnam	AS	Communist	128,402	53,300,000	1	26
XW8	Laos	AS	Republic	91,429	3,700,000	1	26
XZ	Burma	AS	Republic	261,790	28,087,000	1	26
YA	Afghanistan	AS	Constitutional Monarchy	250,000	15,900,000	1	21
YB, YC	Indonesia	OC	Republic	735,272	144,300,000	1	28
YI	Iraq	AS	Republic	167,925	13,200,000	1	21
YJ, FU8	Vanuatu (New Hebrides)	OC (16°S, 168°E)	Parliamentary	5,700	90,000	3	32
YK	Syria	AS	Republic	71,498	8,600,000	1	20
YN, HT	Nicaragua	NA	Republic	50,193	2,600,000	1	7
YO	Rumania	EU	Communist	91,699	22,300,000	1	20
YS	El Salvador	NA	Republic	8,260	4,800,000	1	7
YU, YT	Yugoslavia	EU	Communist	98,766	22,400,000	1	15
YV, 4M	Venezuela	SA	Republic	352,145	13,900,000	1	9
YVØ	Aves Island	NA (16°N, 64°W)	Administered by Venezuela	1	0	4	8
ZA	Albania	EU	Communist	11,100	2,700,000	1	15
ZB2	Gibraltar	EU	British Crown Colony	2.3	26,000	3	14
ZD7	St. Helena Island	AF (16°S, 6°W)	Territorial[51]	47	5,000	3	36
ZD8	Ascension Island	AF (8°S, 14°W)	Territorial[51]	34	430	3	36
ZD9	Tristan de Cunha & Gough Islands	AF (37°S, 12°W)	Territorial[51]	81	300	3	38
ZE, Z2	Zimbabwe	AF	Republic	150,333	7,400,000	1	38
ZF1	Cayman Islands	NA (20°N, 81°W)	British Crown Colony	100	9,000	3	8
ZK1	So. Cook Islands	OC (10°S, 163°W)	Dependency[52]	93	21,000	3	32
ZK1	No. Cook Islands	OC (10°S, 160°W)	Dependency[52]	2	-[53]	3	32
ZK2	Niue Island	OC (19°S, 170°W)	Dependency of New Zealand	100	5,000	3	32
ZL	New Zealand	OC	Constitutional Monarchy[54]	103,736	3,200,000	1	32
ZL	Auckland & Campbell Islands	OC (53°S, 168°E)	Administered by New Zealand	250	0	4	32
ZL	Chatham Islands	OC (44°S, 176°W)	Administered by New Zealand	400	500	3	32
ZL	Kermadec Islands	OC (30°S, 178°W)	Administered by New Zealand	13	8	4	32
ZM7	Tokelau Islands	OC (9°S, 172°W)	Administered by New Zealand[54]	4	2,000	3	31
ZP	Paraguay	SA	Republic	157,048	3,300,000	1	11
ZS1, 2, 4, 5, 6	South Africa	AF	Republic	471,445	28,400,000	1	38
ZS2	Prince Edward & Marion Islands	AF (47°S, 38°E)	Administered by South Africa	180	0	4	38
ZS3	Southwest Africa (Namibia)	AF	Dependency of South Africa[55]	318,261	638,000	2	38
IAØ[56]	Soverign Military Order of Malta	EU	Theocracy	0.0003	80	1	14
1S[56]	Spratly Islands	AS (8°N, 112°E)	Claimed by China, Viet Nam & The Philippines[57]	1.5	0	4	26
3A	Monaco	EU	Principality	0.58	25,000	1	14
3B6, 3B7	Agalega & & St. Brandon[58]	AF (10°S, 57°W & 16°S, 60°W)	Dependencies of Mauritius	27.5	55	4	39
3B8	Mauritius	AF (20°S, 57°E)	Constitutional Monarchy[42]	720	900,000	1	39
3B9	Rodriguez Island	AF (20°S, 63°E)	Dependency of Mauritius	40	13,333	3	39
3C, EAØ	Equatorial Guinea	AF	Republic	10,800	400,000	1	36
3CØ	Annobon Island	AF (2°S, 6°E)	Administered by Equatorial Guinea	5.5	1,400	3	35
3D2, VR2	Fiji Islands	OC (17°S, 178°E)	Constitutional Monarchy	7,055	600,000	1	32
3D6, ZS7 & ZD5	Swaziland	AF	Constitutional Monarchy	6,704	600,000	1	38
3V8	Tunisia	AF	Republic	63,379	6,500,000	1	33
3X, 7G	Republic of Guinea	AF	Republic	94,926	5,000,000	1	35
3Y, LA/G	Bouvet Island	AF (55°S, 3°E)	Administered by Norway	20	0	4	38
4S7	Sri Lanka	AS	Parliamentary	25,332	14,800,000	1	22
4U1	ITU, Geneva	EU	Club	1 room	0	5	14
4U	ITU, New York	NA	Club	1 room	0	5	5
4W	North Yemen	AS	Republic	75,290	5,700,000	1	21
4X, 4Z	Israel	AS	Republic	7,992	3,900,000	1	20
5A	Libya	AF	Military	679,362	3,000,000	1	34
5B4, ZC4	Cyprus	AS	Republic	3,572	643,000	1	20
5H3, VQ3	Tanzania	AF	Republic	362,821	18,600,000	1	37
5N2, ZD2	Nigeria	AF	Republic	356,669	77,100,000	1	35
5R8, FF8	Malagasy Republic	AF	Republic	226,658	8,700,000	1	39
5T	Mauritania	AF	Republic	397,956	1,600,000	1	35
5U7	Niger Republic	AF	Republic	489,191	5,500,000	1	35
5V	Togo	AF	Presidential Regime	21,622	2,500,000	1	35
5W1, ZM6	Western Samoa	OC	Parliamentary	1,097	200,000	1	32
5X5, VQ5	Uganda	AF	Republic	91,134	13,700,000	1	37
5Z4, VQ4	Kenya	AF	Republic	224,960	15,900,000	1	37
601, 2, 6, T5	Somali Republic	AF	Republic	246,200	3,600,000	1	37
6W8	Senegal Republic	AF	Republic	75,750	5,700,000	1	35
6Y5, VP5	Jamaica	NA	Parliamentary	4,232	2,200,000	1	8
70, VS9A	Southern Yemen	AS	Council	111,075	1,300,000	1	21
7P8, ZS8	Lesotho	AF	Constitutional Monarchy	11,720	1,300,000	1	38
7Q7, ZD6	Malawi	AF	Republic	45,483	6,100,000	1	37
7X, FA	Algeria	AF	Democratic Republic	919,595	19,000,000	1	33
8P, VP6	Barbados	NA (13°N, 59°W)	Parliamentary	166	300,000	1	8
8Q, VS9M	Maldive Islands	AS (4°N, 73°E)	Constitutional Monarchy[42]	115	113,000	1	22
8R, VP3	Guyana	SA	Republic	83,000	900,000	1	9
8Z4	Saudi Arabia-Iraq Neutral Zone	AS	Administered by UN	-	0	4	21
9A1, M1	San Marino	EU	Republic	24	20,000	1	15
9G1, ZD4	Ghana	AF	Republic	92,100	11,700,000	1	35
9H1, ZB1	Malta	EU	Parliamentary	122	305,000	1	15
9J2, VQ2	Zambia	AF	Republic	290,586	5,800,000	1	36
9K2	Kuwait	AS	Emirate	6,178	1,300,000	1	21
9L1	Sierra Leone	AF	Parliamentary Federation[59]	27,699	3,500,000	1	35
9M2, 4	West Malaysia	AS	Parliamentary Federation[59]	50,700	11,000,000	1	28
9M6, 8	East Malaysia	OC	Parliamentary Federation[59]	77,730	3,000,000	1	28

Say You Saw It In CQ

Prefix	Country	Continent	Area in Square Miles	Permanent Population	Class of Country	Zone
9N1	Nepal	AS	54,362	14,000,000	1	22
9Q5, 0Q5	Zaire (Formerly Republic of the Congo)	AF	905,568	29,300,000	1	36
9U5	Burundi	AF	10,747	4,500,000	1	36
9V	Singapore	AS	224	2,400,000	1	28
9X5	Rwanda	AF	10,169	5,100,000	1	36
9Y4, VP4	Trinidad/Tobago	SA	1,980	1,200,000	1	9
	Abu Ali, Jabal at Tair	AS (16°N, 42°E)	-	-	4	21
	Blenheim Reef	AF (4°S, 73°E)	0	0	5	39

Large-size wall chart of DX Countries available from CQ Magazine. See page 118.

Class 5 Country - No potential to become a Class 1 or 2 Country. Many Class 5 Countries are small uninhabited islands which are incapable of sustaining a population on even a temporary basis.

In the following table we have attempted to add to your knowledge of the amateur radio countries by furnishing data on locations, forms of government, estimated area, estimated permanent population, Class of Country by the *CQ* definitions, and zone for WAZ. For island countries, latitude and longitude have been added to help you pinpoint them on your maps. Footnotes have been used generously to provide further information on interesting points without unduly complicating the tables. We do not consider ourselves to be political scientists and have relied on standard encyclopedias for information on form of government, area, and population. Maps published by the National Geographic Society were indispensible in locating countries, and in some cases were our best source of estimates of country area. A dash in the area or population column indicates that figures were not available from any of our sources.

Our final tally shows 156 entities which definitely are countries (Class 1), 56 economically and politically developed entities which are almost countries (Class 2), 68 entities with a definite potential to become countries (Class 3), 32 entities with only slight potential to become countries (Class 4), and 14 entities with virtually no possibility of becoming countries (Class 5).

Footnotes

[1]Described by references as government without elected representatives, or if a legislative body exists it is totally subservient to Communist Party leadership. Governmental policy is dictated by Communist Party officials and tight police control is maintained to eliminate or suppress political opposition.

[2]Nominal allegiance to President of France and Spanish Bishop of Urgel as "Co-Princes."

[3]Scientists and military personnel rotated on a regular basis are not counted.

[4]Overseas Province of Portugal. Inhabitants are Portuguese citizens.

[5]The Balearic Islands are a Province of mainland Spain, about 60 miles off-shore.

[6]The Canary Islands make up two Provinces of Spain.

[7]Two Spanish enclaves just across the Straits of Gibraltar in N.W. Africa.

[8]Overseas Territory of France.

[9]About 180–360 scientists are rotated annually through the French Southern and Antarctic Territories.

[10]A Department of Metropolitan France, 100 miles from the mainland.

[11]Overseas Department of France.

[12]One of four countries comprising the United Kingdom of Great Britain and Northern Ireland.

[13]French is the official language on Jersey Island.

[14]Bajo Nuevo consists of a sandbar about 30 feet wide.

[15]Malpelo consists of a large rock rising to 845 feet above the sea. Landing is extremely hazardous and serious accidents have occurred.

[16]The Country List does not recognize the establishment of separate governments in North and South Korea.

[17]The area of Vatican City is 108.7 acres.

[18]Formerly the Bonin and Volcano Islands.

[19]Formerly called Marcus Island.

[20]Navassa Island is a rocky island with a lighthouse.

[21]Major islands are Truk and Ponape which are two of the six separately administered districts in the UN Trust Territory of the Pacific.

[22]Major islands are Palau, Yap, Ulithi, and Peleliu. Palau and Yap are two of the six separately administered districts in the Trust Territory.

[23]The base is administered according to the terms of a U.S.-Cuban treaty which can only be terminated by mutual consent.

[24]Guam has locally elected government, and residents are U.S. citizens.

[25]Principal islands are Rota, Saipan, and Tinian.

[26]According to the National Geographic Society, Kure Island is part of Hawaii. However, the Midway Islands lie between Kure and the remainder of Hawaii. Midway is independent of Hawaii, thus constituting intervening territory under Rule 3.

[27]Puerto Rico is a self-governing Commonwealth under the U.S. flag. Puerto Ricans are U.S. citizens.

[28]American Samoans are nationals but not citizens of the U.S.

[29]Natives of the U.S. Virgin Islands are U.S. citizens.

[30]The Marshall Islands are one of the administrative districts in the UN Trust Territory of the Pacific.

[31]One of the 12 Provinces of Finland.

[32]Not shown on National Geographic Society map of Scandanavia.

[33]A Province of Denmark.

[34]Self-governing Danish territory.

[35]Includes the islands of Aruba, Curacao, and Bonaire.

[36]Self-governing Dutch territory.

[37]Population figures for various sub-divisions of the USSR vary widely between references.

[38]Part of the European Russian SFSR.

[39]The USSR is composed of 15 associated soviet socialist republics under one central government in Moscow. Each of these republics could potentially be a Class 1 country.

[40]The U.S. does not recognize the Soviet conquest of Lithuania, Latvia, and Estonia in 1940 and considers each of these three countries to be independent.

[41]Area and population of Sable Island and St. Paul Island are not shown in our references.

[42]Under British Crown.

[43]Administered by New South Wales.

[44]Administered from Tasmania.

[45]Steps toward independence have been initiated.

[46]One of the West Indies Associated States, under the British Crown.

[47]Administered from the Falkland Islands.

[48]Part of the British Indian Ocean Territories.

[49]British territory administered from Fiji.

[50]Governed by India.

[51]St. Helena is the British administrative center for Ascension, Gough, Tristan de Cunha, Inaccessible and Nightingale Islands.

[52]The Cook Islands are a self-governing dependency of New Zealand, but are also claimed by the U.S.

[53]The population of the Northern Cook Islands cannot be determined from our references.

[54]Was claimed by the U.S. at one time. The present status of the U.S. claim is not known.

[55]Southwest Africa, or Namibia, is a self-governing dependency of South Africa.

[56]This is an unofficial prefix, as the ITU does not recognize prefixes beginning with the figure 1.

[57]See the February, 1972 issue of *CQ*, pages 64–66.

[58]On National Geographic Society maps Agalega and St. Brandon appear to be about 400 miles apart.

[59]In the British Commonwealth.

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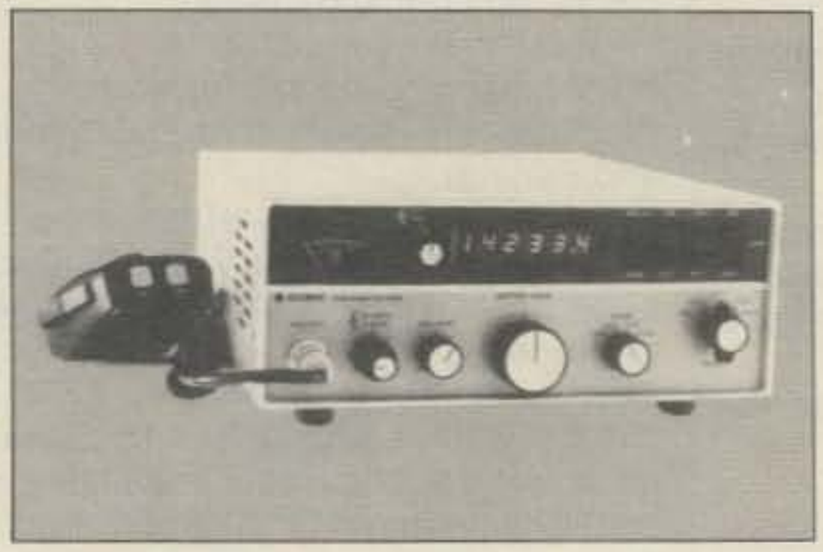

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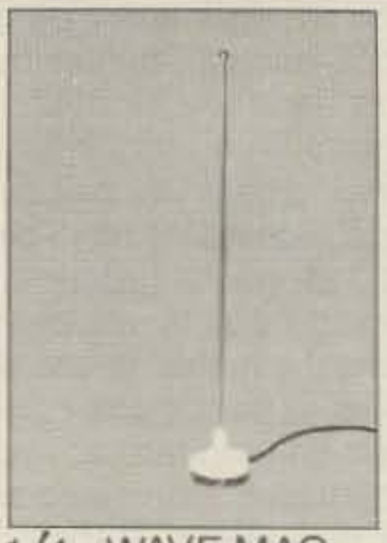

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USA
Single Operator
All Band

K1AR	3,569,262
W1ZM	3,207,992
K2TR	3,153,664
K2BU	2,653,150
W3BGN	2,493,400
WA8ZDT	2,185,528
N2LT	2,056,912
N3AD	2,008,800
N7DF	1,920,192
W9RE	1,867,278
KØJSY	1,853,484
W6BH	1,795,212
K3OO	1,778,700
N6CW	1,729,134
WA1TFF	1,582,032
AK1A	1,490,138
K3ZVF	1,485,016
W2YV	1,468,448
KA1R	1,390,830
W3GG	1,348,035
AI9J	1,266,165
N6AR	1,227,276
K5KG	1,217,160
W6PU	1,215,456
W2TA	1,212,636
K2NJ	1,115,224
KD6NH	1,113,528
W6MSF	1,064,329
WA4QQV	1,028,034
W3HKK/8	1,028,014

1.8 MHz

WB3GCG	1,280
N4IN	1,173
K5UR	1,008
W4PZV	738

3.8 MHz

W7IVX	24,603
WA4SVO	23,700
N7RK	23,595
AB1A	20,976
W4NL	20,377

7 MHz

KØRF	152,574
K7UR	97,478
K6QEH	93,930
K9KA	58,860
K2IGW	57,810
KBØU	53,636
W8UVZ	50,796
W9CH	50,295

14 MHz

K2HFX	487,700
WØUA	305,610
W6YA	287,888
K1NG	284,170
W7IL	282,408
K2RD	273,240
WA9ZPR	233,532

21 MHz

K7RI	630,136
KM6B	570,038
W9ZRX	549,690
K9DX	514,098
W9NG	439,110
WBØCMM	422,280
K5GA	348,634
W6XJ	340,136
K4ISV	332,592
K4PI	303,300

28 MHz

N7DD	943,040
WØZV	663,170
K5RC	627,980
W1WEF	535,382
W5XZ	500,030
W6RR	479,360
WB4DWD	463,144
N4ZZ	419,882
K5KLA	410,248
K9RN	389,620
N4CT	359,936

Multi-Single

K3LR	3,867,208
KX4S	3,860,888
WB2FZO	3,771,040
N4ZC	3,755,224
W4QAW	3,722,928
KØUK	3,537,420
W6RDF	3,154,782
N1TZ	3,015,426
N2RM	2,957,505
N8JW	2,919,735
W9DUB	2,877,894
AD8P	2,806,768
K6MYC	2,737,026
K5TA	2,605,024
KB3AG	2,368,740
K1UO	2,353,783
KE2C	2,256,428
N4KG	2,182,275

Multi-Multi

W2PV	10,760,136
N5AU	10,095,618
K1OX	8,032,925
KN6M	7,360,254
W3LPL	7,346,016
K9GL	6,713,672
K3WW	6,172,320
K1CC	5,836,050
N2SS	5,470,413
N6RO	5,354,925
K4VX/Ø	5,338,782

QRP

WB2GLI	505,997
K3LR	434,720
N2US	171,264
AJ7S	148,144
K7HBN	140,454
WA4FHQ	130,720
N2GC	121,752

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All Band

9Y4VT	11,109,483
HI8PGG	9,061,402
N6KT/HKØ	6,875,981
4M2AMM	5,782,244
KH6XX	5,762,196
DK3GI	4,461,908
DK8NG	4,127,424
VP2MBA	3,647,272
4XØU	3,644,139
DJ3HJ	3,338,888
VE7WJ	3,312,148
I5SDG	3,139,845
LU1BR	3,131,430
OA4AWD	2,989,840
OHØBH	2,728,468
SM5GMG	2,610,925
D4CBC	2,527,380
I4AVG	2,407,132
PA2TMS	2,272,424
GD5DZP	2,197,148
EA3JE	2,137,248
VE3GCO	2,108,292
G3XTT	2,016,228
LU2DSL	1,786,112
CN8CO	1,782,980
ZS3HL	1,772,088
JH1CNT	1,723,752
I5VXG	1,670,834
F9GL	1,661,352
TYA11	1,630,200
EF7TV	1,628,998
DK8AX	1,619,904
HZ1HZ	1,605,450

1.8 MHz

UP2BAW	20,091
YU3EF	7,611
VE3MFA	6,076
OK1KPU	4,740
4X4NJ	4,104
VE3BBN	4,015
SP9DH	3,904

3.8 MHz

YV3AZC	160,740
C6ADV	85,666
YU4VBR	80,377
YU3APR	79,390
I4CSP	76,540
DF9QU	70,551
I4EAT	61,952
HA5KDB	58,812
LA7JO	53,950

7 MHz

VP2KAE	432,942
I6NOA	292,152
YV3BQS	291,744
4Z4DX	257,476
CT2CE	251,580
HC1HC	183,120
CT3BD	179,305
G3UKS	174,130
SMØAJU	131,000
DF3TJ	123,552
UR2QD	115,080

14 MHz

VP2KAA	2,026,828
ZF2FL	1,951,279
OE6MBG	1,025,803
KG6DX	964,320
VO2CW	923,010
4S7AAG	918,925
YV1DQU	882,735
YV4CB	879,264
4X6DX	836,993
DLØPG	786,784
KX6PI	739,752
XDØLCH	671,944
I2VRN	645,610
4X6BYB	617,785

21 MHz

VP2KAC	1,714,422
EL2AV	1,508,904
YV3BJL	1,377,090
VE3BMV	1,131,990
I4ZSQ	1,129,929
CX3BBH	1,107,312
YU7OCV	935,040
DL8PC	739,508
VE7IN	737,100
4Z4EU	650,808
OK1TN	637,392
I1YBM	623,496
UA1DZ	581,385
OH3YW	558,975

28 MHz

ZZ5EG	1,900,416
KB7IJ/KH2	1,464,608
9H1EL	1,355,760
I8UDB/IC8	1,355,648
YO1K	1,159,173
EA6ET	1,107,358
GW4BLE	947,223
YU4QD	934,040
4Z4AB	890,356
LU5FGG	790,644
JH1AJT	735,165
G4FAM	693,728
DJ8RI	658,688
VE3LNW	598,635
CT2CQ	587,076

Multi-Single

I3MAU	8,104,665
HP1XRK	7,932,712
Y23EK	7,247,100
HK3A	6,420,100
VE1DXA	6,057,990
HG5A	6,041,920
PJ8UQ	6,023,544
I1KN	5,766,519
F3TV	5,716,480
VE3PCA	5,240,287
HG6V	5,046,406
EA7TH	5,014,245
8P6MH	5,014,140
LU1MA	5,004,850
HBØBHA	4,661,180
OH5SM	4,097,004
ZS6BPL	4,039,672
KL7Y	3,905,308
VE3BVD	3,761,032
UK6LEZ	3,610,800
UK2BBB	3,575,178
OK1KSO	3,565,354
KH6N	3,516,480

Multi-Multi

P41C	41,957,244
KG6RE	19,072,638
YTØR	13,548,648
VP9AD	13,391,272
K6HNZ/CT3	13,148,240
HB9H	6,666,720
KL7RA	5,914,831
HZ1AB	5,611,450
KL7IRT	4,850,005
JA3YBF	4,076,336

QRP

I5NSR	669,507
DF4RD	407,313
ON6NL	344,268
OK3CGP	299,446
JI1CBF	142,800
I5JHW	102,500
JA1EF	100,386

The C.W. High Claimed Scores were being compiled as this issue was being completed. They will be presented next month.

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Contest Calendar

NEWS/VIEWS OF ON-THE-AIR COMPETITION

In reviewing the WPX Contest rules and pointing out items that are different from those used in our World Wide Contest, I thought it might be of interest if I explained why some of these modifications were made.

The first one on the list is the 30 hour limit in operating time for single operator stations. Right from the beginning it was realized that 48 hours made it an endurance test if you were a serious competitor. Cutting it down to 30 hours allows time out for sleeping and meals while still being competitive in the contest.

Next, is the counting of a prefix multiplier once only and not once on each band. It's quite obvious why we made this decision. Can you imagine the size of the scores if the multiplier was the number of different prefixes worked on each band, especially with the addition of all those crazy calls that have popped up in recent years? Scores just would not look realistic.

Since the use of the lower bands was no longer profitable in gaining a new multiplier, it was suggested that the QSO point value be increased on those bands. This would create an incentive to operate in the three lower bands and build up a big QSO point total.

The multi-operator, single transmitter category has always been a controversial operation, even though it was clearly spelled out that operation was limited to one transmitter and one band only within a given time period, except that one other band could be used to pick up new multipliers. You cannot believe the different gimmicks tried by many contesters to get around this restriction. So W8IMZ has made it very clear in the 1982 WPX rules. Only *one* transmitter and only *one* band may be used during the same time period (defined as 10 mins.). No exceptions. Period.

Briefly that's what the WPX Contest is all about. The World Wide Contest is geared to our WAZ award program, the WPX Contest to our WPX award program. Both are set up to achieve different goals and therefore require different rules.

14 Sherwood Road, Stamford, CT 06905

Calendar of Events

* May	1-2	County Hunters SSB Contest
May	1-2	Seville (EA) WW Contest
* May	1-3	Georgia QSO Party
May	2	"Corona" 10 Meter RTTY
† May	8-9	USSR "CQ-M" Contest
† May	8-9	World Telecomm. Phone
May	15-16	World Telecomm. C.W.
* May	15-16	ARRL EME Contest (Part 2)
May	15-16	Florida QSO Party
May	15-17	Michigan QSO Party
May	22-23	Rocky Mt. QSO Party
May	**29-30**	**CQ WW WPX C.W. Contest**
May	29-30	Ibero-American Phone Contest
June	12-13	ARRL VHF Contest
June	12-13	South America C.W. Contest
June	18-20	SMIRK QSO Party
June	19-20	All Asian Phone Contest
June	26-27	ARRL Field Day
July	3-4	Venezuelan Phone Contest
July	17-18	International QRP Contest
July	24-25	Venezuelan C.W. Contest
Aug.	7-8	European C.W. Contest
Aug.	14-15	SARTG RTTY Contest
Aug.	21-22	All Asian C.W. Contest

* Covered last month.
† Unofficial

A reminder for people who wish to include material in this column: The deadline for material for the August issue is May 15th, and June 15th for the September issue.

73 for this time, Frank, W1WY

CQ WW WPX C.W. Contest

Starts: 0000Z Saturday, May 29
Ends: 2400Z Sunday, May 30

A reminder of our WPX C.W. Contest coming up at the end of this month. Results of last year's contest in this issue will give you an idea of the activity you can expect.

Rules and scoring are exactly the same as for the s.s.b. section last March. The rules and details were published in the February issue, with a follow-up in the March Calendar.

Not to be confused by some of the regulations in our World Wide contest held in the fall, here are a few items to keep in mind.

This spacious reception room is the headquarters of the Valparaiso Radio Club, CE2AA.

Par. I—Only 30 hours out of the 48 hour contest period are permitted for single operator stations. The off times may be taken in up to 5 periods any time during the contest.

Par. IV—Multi-operator, single transmitter. Only one transmitter and one band permitted during the same time period, defined as 10 mins.—no exceptions. (Which means you are limited to one transmitter and you must stay on the same band for a minimum of 10 minutes. No QSYing to another band to pick up a new multiplier.)

Par. VI—QSO points on the three lower bands, 7, 3.5 & 1.8 MHz are worth double those for contacts on 28, 21 & 14 MHz.

Par. VII—The Prefix multiplier is counted *once only*, not once on each band.

Observe closely the definition of the prefix for stations operating in a call area different than that indicated in the call sign. The station is required to identify the area, and the portable prefix is the multiplier (*i.e.:* W8IMZ/4 counts as W4), not to be confused with the recent interpretation made by the WPX awards program.

Par. XI—This year 16 Plaques and Trophies are being awarded in the C.W. section. A new one that does not appear in the rules announcement is for the World top score on 3.5 MHz, donated by Lance Johnson Engineering.

The eligibility clause remains at *two* years, except for certain categories as indicated.

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Par. XIII—An alphabetical/numerical check list of the claimed Prefix multiplier is required with your contest log.

Mailing deadline for your logs is July 10th and they can be sent to:

CQ Magazine, WPX Contest
76 N. Broadway
Hicksville, NY 11801
or
Bernie Welch, W8IMZ
7735 Redbank Lane
Dayton, Ohio 45424

Seville (EA) World Wide Contest

Starts: 1600Z Saturday, May 1
Ends: 2000Z Sunday, May 2

Take note of the "Special Award" of this contest organized by the Seville Radio Club of Spain. It's a world-wide type contest similar to our CQ WW contest.

Use all bands, 3.5 through 28 MHz. Only single operator, all band, s.s.b. and/or c.w. operation is permitted. Use 24 out of the 28 hour contest period. The 4 hours of non-operation may be taken in one or two periods. The same station may be worked on each band for QSO and multiplier credit.

Exchange: RS(T) plus a QSO number starting with 001.

Points: Contacts between stations in the same country, 2 points. Between stations in different countries, 3 points. (Contacts between EA and EA6, EA8 and EA9, 2 points.)

Multiplier: Each different DXCC country worked on each band.

Scoring: Total QSO points from all bands multiplied by the sum of different countries worked on each band.

Awards: Certificates to the top scorer in each country and each EA, JA, VE and W/K call area. A special certificate to the leaders in each continent.

A "Special Award" goes to the two overall winners, Spain and the World—an all expense paid trip for two to the "Seville April Fair Feast" offered by the Seville City Council for the following year.

Use a separate log sheet for each band, indicate each multiplier only the first time it is worked, and include a summary sheet showing the scoring and other essential information with the usual signed declaration. Logs will be closely checked for excessive dupes and other violations, so a word to the wise.

Entries must be postmarked no later than June 30th and go to: The Seville World Wide Contest, Radio Club Sevilla, P.O. Box 555, Sevilla, Spain.

DARC "Corona" 10 Meter RTTY

1100–1700 UTC Sunday, May 2

This is the 2nd of a series of 4 tests held by the DARC to increase RTTY activity on the 10 meter band. The 1st one was held on March 6th; the following 2 will take place on September 4th and November 7th.

At the information desk are CE2DCR and CE2DMU. The caption with the photo did not identify the call of the pretty YL.

There are three classes: single operator, multi-operator, and s.w.l.

Activity of course is on 10 meters only in that portion of the band normally used for RTTY.

Exchange: RST, QSO no., and your name.

Points: One point for each completed QSO.

Multiplier: Each country as determined by the DXCC and WAE country lists, and each call area for W/K, VE/VO, and VK. (The last WAE list appeared in the August '81 Calendar.)

Final Score: Total QSO points times the total multiplier as indicated above.

Awards: Plaques to the leading stations in each of the three classes.

Contacts made in this contest may be credited for the EURD Award, provided of course that the log of the requested station has also been received. Therefore claims should not be made before the final results have been published.

Mailing deadline for all entries is within 30 days after each test. They go to: Klaus Zielski, DF7FB, P.O. Box 1147, D-6455, Erlensee, West Germany.

USSR "CQ-M" Contest

Starts: 2100 GMT Saturday, May 8
Ends: 2100 GMT Sunday, May 9

No official announcement was received this year. Following is the format used last year and hope it's okay.

Do not limit your operation to working the USSR only. It's a world-wide type contest same as our CQ WW. Contact may be made on c.w. or s.s.b., 3.5 through 28 MHz. The same station may be worked on each band but not both modes for QSO and multiplier credit. Contacts via Oscar count as an extra band when made on 144 to 2 MHz.

Classes: (A) Single operator, single band. (B) Single operator, all band. (C) Multi-operator, single transmitter, all band. (D) S.w.l.

Exchange: RS(T) plus a 3 figure QSO number. The USSR stations, RS(T) plus the number of their region (oblast).

Points: Contacts between stations on the same continent 1 point, different continents 3 points. Own country may be worked for multiplier credit but no QSO points.

Multiplier: Is determined by the number of countries worked on *each band*. The USSR "R-150-S" list is the standard, which essentially is the same as our DXCC plus the following additions: Oblasts 002, 013, 014, 056, 084-5-6-7-8-9, 090-1-2-3-4-5-6-7-8, 159 and UA1 Novaya Zemlya, UA0 Kuril Is., UA0 New Siberian Is.

Final Score: Total QSO points from all bands times the country/oblast multiplier from each band.

The s.w.l.'s get 1 point for reporting one station exchange, 3 points if both stations and their exchange.

Awards: For foreign station winners. Classes (B) and (C) a Trophy donated by the USSR *Radio* magazine. Classes (A) and (D) special medals and badges. And badges to everyone contacting at least 10 USSR stations.

Contest contacts may be credited for USSR awards in lieu of QSL cards if the request is made with your entry (R-150-S, R-100-O, W-100-U, R-15-R, R-6-K, R-10-R).

Mailing deadline is July 1st to: Krenkel Central Radio Club, "CQ-M" Contest Committee, P.O. Box 88, Moscow, USSR.

World Telecomm. Contest

Phone: 0000–2400 GMT Sat., May 8
C.W.: 0000–2400 GMT Sat., May 15

This activity is sponsored by the L.A.B.R.E. to commemorate "World Telecommunications Day" (May 17th).

It's a world-wide contest, the object being to contact as many stations as possible in other ITU Zones. Scoring will be based on all-band operation, single operator and multi-operator, phone and c.w.

Exchange: RS(T) plus your ITU Zone number.

Scoring: QSO points as follows. Between stations in (1) same country, 0 points (but okay for multiplier); (2) different country, same Zone, 1 point; (3) different Zone, same continent, 3 points; (4) different Zone, different continent, 5 points.

Final Score: Total QSO points multiplied by different ITU Zones worked. The same station may be worked on each band for QSO points but Zones are counted only once.

Awards: Diplomas to the highest scorers, single and multi-operator, in each country. Gold, silver, and bronze medals to the top three world single operators. A silver plate to the top multi-operator station. Separate awards for phone and c.w. Additional awards if participation warrants.

The ITU Trophy goes to the country with the highest aggregate single operator scores. The Trophy remains in the possession of the national association of that country affiliated with the IARU for

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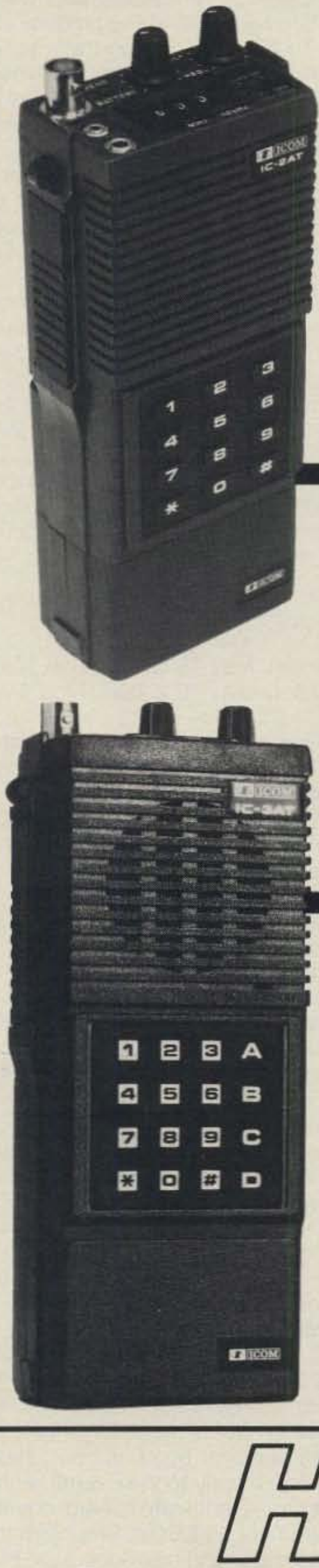

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one year. It is retired by the country winning it 3 times in a 5 year period.

Mail logs before June 30th to: L.A.B.R.E., U.I.T. Contest Coordinator, P.O. Box 07-0004, 70.000-Brasilia, Brazil. Include a self-addressed label and IRC's for results.

Florida QSO Party

1400–1900Z Sat. May 15
0001–0500 & 1500–2300Z Sun. May 16

This is the 17th annual QSO Party sponsored by *Florida Skip*. The same station may be worked on each band and each mode. Phone and c.w. are separate contests and require separate logs. Fla. stations may work other in-state stations for QSO points only.

Classes: Fla. stations are divided into two classes. Class A is portables and mobiles using emergency power running 200 watts or less inside Fla. but outside own county. Class B is all other single operator stations.

Exchange: RS(T) and QTH. County for Fla.; state, VE province, or country for others.

Scoring: *For Florida*—One point per QSO. Multiply total by sum of states (49), provinces (12), and DX countries (27 max.) worked (max. multiplier of 88). Class A multiply final score by 1.5 factor.

Out-of-state—Two points for each Fla. contact. Multiply total by Fla. counties worked (max. of 67).

Frequencies: C.W.—3555, 7055, 14055, 21055, 28055. S.S.B.—3945, 7279, 14319, 21379, 28579, 50.2, 146.52.

Awards: Certificates, both phone and c.w., to the top single operator score in each state, province, DX country, and each Fla. county. And five plaques as follows: To the top single operator score in Fla. and out-of-state, both on phone and on c.w., and to the Fla. club with the highest aggregate score (min. of 5 contacts for a certificate).

There is a disqualification clause for excessive dupes, multipliers, and other obvious reasons. Disqualified stations or operators will be barred from next year's party.

Include a summary sheet showing the scoring and other essential details, a dupe sheet if you make 200 or more contacts, the usual signed declaration, and your name and address in Block Letters. Also include a large s.a.s.e. for the *Florida Skip* issue with the results.

All entries must be received before June 17th and go to: Florida Skip Contest Committee, P.O. Box 501, Miami Springs, FL 33166.

Michigan QSO Party

Two Periods GMT
1800 Sat. May 15 to 0300 Sun. May 16
1100 Sun. May 16 to 0200 Mon. May 17

This year's party is again sponsored by the Oak Park ARC. The same station may be worked on each band and mode, portable/mobile in each county change. Contacts between Michigan counties are permitted for multiplier credit.

Exchange: RS(T), QSO no., and QTH. County for Mich.; state or country for others.

Scoring: *For Mich.*—One point for phone contacts, 2 points if on c.w., and 5 points if with W8MB. Multiply total by (states + countries + Mich. counties) worked. KH6 and KL7 count as states, VE as a country.

Out-of-state—One point for phone, 2 points on c.w., 5 points if it's with club station W8MB. Multiply total by Mich. counties worked (max. 83).

V.h.f. scoring same as above but add multiplier from each band for total multiplier. Oscar contacts are worth 5 points. Repeater contacts not allowed.

Frequencies: CW—1810, 3540, 3725, 7035, 7125, 14035, 21035, 21125, 28035, 28125. S.S.B.—1815, 3905, 7280, 14280, 21380. V.H.F—50.125 and 145.025.

Awards: *Out-of-state:* Certificates to top single operator score in each state and country. Trophy to the overall winner.

Mich.—Certificate to each county winner (min. of 30 QSOs). Trophy to top single operator and multi-operator. Plaques to v.h.f., Mobile, and aggregate club scores.

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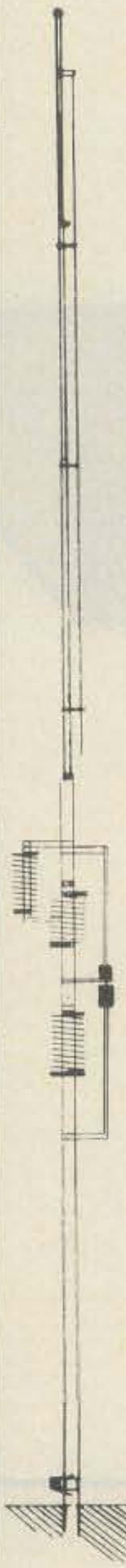

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Please send all reader inquiries directly.

Party contacts do not count toward the Mich. Achievement Award unless one fact about Mich. is communicated.

A summary sheet is requested, showing the scoring the other pertinent information, and a signed declaration that rules and regulations have been observed.

Results will be mailed to all entrants. Mailing deadline is June 30th to: Mark Shaw, K8ED, 3810 Woodman, Troy, Mich. 48084.

Michigan Achievement Award

All contacts with Michigan stations made during Michigan Week, May 15–22, as well as Party QSOs, may be used for this award if the following requirements are fulfilled.

1. Michigan stations—Submit a log with information, name and address of station worked if possible, of 15 or more QSOs with out-of-state or DX stations, with information about Michigan.

2. Out-of-state stations including Canada—Submit a log with information, name and address if possible, of at least 5 Mich. stations worked who related facts about Michigan.

3. DX stations—Work at least one Mich. station, with log information, name and address, and relate fact about Michigan given by the station worked.

4. Only contacts made during Michigan Week, May 15–22, are valid for this award.

Applications for certificates must be postmarked no later than July 1st 1982 and mailed to: Governor William Milliken, Lansing, Mich. 48902.

(Facts about Michigan: State Bird, Robin; Fish, Trout; Flower, Apple Blossom; Tree, White Pine; Stone, Petoskey. Or any local fact.)

Rocky Mountain QSO Party

Starts: 1800Z Saturday, May 22
Ends: 2400Z Sunday, May 23

This year's party is again being sponsored by the Arapaho R.C. of Littleton, Colo. Stations outside the Rocky Mt. Division will work RM stations only, those within the Division may work anyone. (DX may be worked for QSO credit but no multiplier.)

The same station may be worked on each band and in each mode, mobiles in each county change. (Try phone on odd hours, c.w. on even hours.)

Exchange: RS(T), state, VE province or country. RM stations will include their county (Colorado, New Mexico, Utah and Wyoming).

Scoring: Contacts on phone 1 point, on c.w. 2 points. RM stations: QSO points × (states + provinces + RM countries).

Outside RM: QSO points × (RM states + RM counties).

Mobiles compute their scores separately for each state that they operate from.

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Frequencies: C.W.—60 kHz above bottom of each band. S.S.B.—3900, 7270, 14300, 21370, 28570. Novice—25 kHz above bottom of each Novice band.

Awards: To top scorers in each state, VE province, mobile in each RM state, DX and top Novice. Additional awards if activity warrants.

Submit logs and summary sheets within 30 days to: Dan Broadbooks, KBØYU, 1027 South Tennyson, Denver, Colo. 80219.

Ibero-American Phone Contest

Starts: 2000Z Saturday, May 29
Ends: 2000Z Sunday, May 30

This one is sponsored by the Union de Radio-aficionados Espanoles (U.R.E.). Only contacts with Iberoamerican countries are valid.

Use all bands 160–10 meters. Single operator, phone only. The same station may be worked on each band for QSO and multiplier credit.

Exchange: RS plus a three figure QSO number.

Scoring: Total QSO's from all bands times the number of Iberoamerican countries worked on each band.

Multiplier country list: CE, CO, CP, CR, CT, C9, CX, C31, DU, EA, HC, HI, HK, HP, KP4, LU, OA, PY, TG, TI, XE, YN, YV, ZP, 3C, and their DXCC dependencies.

Awards: To stations making 50 or more QSO's. (And to contest winners in each country?)

Mailing deadline for all entries is July 15th to: Union de Radioaficionados Espanoles, P.O. Box 262, Granollers, Spain.

(In the 1981 contest HI3DJP/W2 with 384 points and W8WT with 221 points were the only stateside stations that qualified for an award.)

a regular feature by

THEODORE J. COHEN, N4XX

dateline... Washington, D.C.

THE INS AND OUTS OF THE WASHINGTON SCENE

Commission Staff Examines Novice Licensing Procedures

According to James C. McKinney, Chief, Private Radio Bureau, FCC, Bureau personnel are now examining a proposal to change the way in which Novice exams are given. Specifically, the proposal, if adopted, would delegate to higher-grade amateurs the responsibility for *developing and administrating* Novice exams. Questions of a technical, procedural, or legal nature would, under the terms of the proposal, be developed from guidance material furnished by the FCC. Thus, the amateur examiner would be able to administer the written portion of the exam immediately after the applicant has passed the code test.

McKinney believes that the proposed one-step licensing procedure has many advantages, not the least of which are that it would "streamline" the licensing operations at Gettysburg, PA, and would reduce the Commission's paperwork load. Another important factor, however, is that the time between passage of the code test and issuance of a license would be reduced significantly. Said McKinney: "We want to get the new Novice licensees on the air as quickly as is possible so that they do not lose interest in amateur radio while waiting for their 'ticket.'"

R.F.I. Complaints Remain At High Level

Jeffrey Young, Enforcement Division, FOB, FCC, reports that during the first quarter of FY82 (October, November, and December 1981), r.f.i. complaints to the Commission totaled 20,597. This is approximately equal to the number of complaints received in the same quarter one year earlier, indicating that r.f.i. complaints to the FCC are still numbering over 80,000 on an annualized basis.

Of the 20,597 complaints received, Young noted that television receivers were the victim devices in 16,597 cases. Of these, CB operations were alleged to be involved in 11,768 cases of t.v.i. while amateurs were cited in 740 cases.

In all, CBers were alleged to be involved in 13,079 r.f.i. complaints, while amateurs accounted for 1,141. Complaints by amateurs against other amateurs were down from one year ago (362 versus 491), although the number is still high enough to be of concern to the Commission.

Finally, cable television systems were cited in 21 of the r.f.i. complaints, with an increasing number of complaints being received from amateurs who are experiencing interference from these systems. Readers who experience r.f.i. from cable TV systems are urged to notify the FCC and the ARRL immediately so that appropriate action may be taken.

Amateurs Report R.F.I. Cases Involving Sudden-Infant-Death Syndrone Monitors

Scattered reports are reaching your Washington editor of alleged interference to SIDS monitors from amateur operations. That such devices may be susceptible to r.f. energy is a matter of concern to all of us, for false alarms, regardless of how they are caused, obviously scare the parents of infants monitored.

In some of the cases reported, SIDS monitors were actually shown to be susceptible to r.f. energy from nearby transmitters. Other monitors, however, appeared to "false" repeatedly during operation for reasons apparently related to their design. Regardless of the cause, amateurs were initially blamed for the problem.

If you are involved in an alleged case of r.f.i. which is related to an SIDS monitor or to any other device, notify the FCC and the ARRL immediately:

Federal Communications Commission
Attn: Field Operations Bureau
1919 M Street, NW
Washington, DC 20554

American Radio Relay League
Attn: Mr. Harold Steinman, K1FHN
225 Main Street
Newington, CT 06111

Your reports are the only means by which the FCC and the ARRL can gauge the severity of the r.f.i. problem facing amateurs.

New EMI/EMC Magazine Debuts

Increasing concern with electromagnetic interference (e.m.i.) and electromagnetic compatibility (e.m.c.) has led to the introduction of a new magazine devoted to these important topics: *EMC Technology*. Published quarterly by Don White Consultants, Inc., the magazine is directed at the world community of engineers, technicians, manufacturers, and marketing personnel engaged in the design, manufacture, and distribution of electronic products.

The magazine will provide comprehensive articles which address specific areas of interest to the e.m.c./e.m.i. community. Written by accomplished professional engineers, the material is guaranteed to provide readers with state-of-the-art information on topics such as automated e.m.i. measurement systems, interference to satellite earth stations, audio rectification, e.m.c. management problems (authority, responsibility, planning, and costs), and the use of fiber optics in e.m.i. environments.

For more information on *EMC Technology*, write to: Circulation Director, EMC Technology, P.O. Box D, Gainesville, VA 22065.

8603 Conover Place, Alexandria, VA 22308

Say You Saw It In CQ

ARRL Releases 2nd Edition Of R.F.I. Handbook

In early 1982, the ARRL released the 2nd Edition of its popular handbook *Radio Frequency Interference . . . How to Identify It and Cure It.*

The handbook, which addresses r.f.i. problems frequently experienced by amateurs, has been modified to include much new material, including a chapter on interference problems particular to cable TV (CATV) systems.

Also included is an updated Consumer Products R.F.I. Assistance List. This list, prepared by Hal Richman, W4CIZ, provides a comprehensive review of the policies followed by major consumer-product manufacturers in responding to your r.f.i. complaints.

Copies of the ARRL's handbook of r.f.i. can be obtained for $3.00 postpaid by writing to the ARRL, 225 Main Street, Newington, CT 06111.

Armed Forces To Conduct Annual Communications Test

This year's observance of Armed Forces Day marks the 33rd anniversary of communications tests between the amateur service and the military communications systems. The tests, to be conducted on 15 May 1982, will feature traditional military-to-amateur crossband operations. These operations, which will be conducted on c.w., s.s.b., RTTY, and SSTV, give amateurs an opportunity to demonstrate their individual skills and to receive recognition from the Secretary of Defense.

Special commemorative QSL cards will be awarded to amateurs achieving a verified two-way contact with any of the participating military radio stations. Those who receive and accurately copy the Armed Forces Day c.w. and/or RTTY message from the Secretary of Defense will receive a special commemorative certificate from the Secretary.

The crossband operations will begin at 1300 UTC on 15 May, and will continue until 0245 UTC on 16 May. Military stations will transmit on selected military frequencies and will listen in portions of the amateur bands. The military operators will specify the frequencies to which they will be tuned. Amateurs should look for military stations above and below the 80, 40, 20, and 15 meter bands. On 20 meters, for example, the following stations will be active on the frequencies shown:

AIR	13997.5 kHz	(c.w.)
AIR	14390.5 kHz	(u.s.b.)
NAV	13975.5 kHz	(SSTV)
NMH	14440.0 kHz	(RTTY)
NPG	13827.5 kHz	(RTTY)
NPG	13927.5 kHz	(c.w.)
NPG	14470.0 kHz	(u.s.b.)
NPL	14385.0 kHz	(SSTV)
NZJ	14480.0 kHz	(u.s.b.)
WAR	14403.5 kHz	(c.w., RTTY, u.s.b.)

The c.w. receiving tests will begin at 0310 UTC on 16 May. Prior to the test, however, a 10-minute call will be provided for tuning purposes. The Secretary's message will be transmitted at 25 wpm. The RTTY receiving tests will commence at 0345 UTC on 16 May, following a 10-minute call which will be provided for tuning purposes. All c.w. and RTTY copy should be submitted "as received" to qualify for an award.

Receiving test entries and requests for QSLs should be sent to the following addresses:

For AIR: Armed Forces Day Test, 2045th CG/DONJM, Andrews AFB, DC 20331.

For NAM, NAV, and NPG: Armed Forces Day Test, HQ, Navy-Marine Corps MARS, 4401 Massachusetts Ave., NW, Washington, DC 20390.

For WAR: Armed Forces Day Test, Commander, 7th Signal Command, ATTN: CCN-PO-OR, Fort Ritchie, MD 21719.

George Jacobs, W3ASK, Named To New Broadcast Agency

President Reagan, in late January, named George Jacobs, W3ASK, to the Commission on Broadcasting to Cuba. Jacobs, former director of engineering of the U.S. Board for International Broadcasting, will join eight other members of the Commission in overseeing the operation of Radio Marti. F. Clifton White, long a Republican Party official, will head the agency.

Radio Marti, named for the turn-of-the-century Cuban liberator Jose Marti, is expected to begin broadcasting later this year, and will be used to counter anti-U.S. propaganda from Fidel Castro's government.

Colonel J.W. Browning, W6SP Receives Nation's Highest Peacetime Military Decoration

Col. John W. Browning, W6SP, has received the nation's highest peacetime military decoration, the Distinguished Service Medal. Col. Browning, AMSAT's Board Chairman, received the decoration at his retirement ceremony in Los Angeles on January 28, 1982. In his capacity as Deputy for Space Communications Systems, Space Division, USAF, he was responsible for five military satellite programs which set forth, in the words of the decoration citation, " . . . the course of military communications satellites for the rest of the decade." Col. Browning's retirement culminates a distinguished career spanning 39 years of dedicated service to his country.

W6SP is especially well known in southern California in connection with AMSAT, Project OSCAR, and the Armed Forces Communications and Electronics Association (AFCEA). He is also President of the Southern California DX Club.

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RG8U #9208 . . . . . $24.95
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RG-214/U (double silver shield—50 ohms) . . . . . $1.35/ft.

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RG213 noncontaminating 96% shield mil spec	36¢/ft.
RG174/U-mil spec 96% shield	08¢/ft.
RG11U 96% shield 75 ohm mil spec	25¢/ft.
RG8U 96% shield mil spec	31¢/ft.
RG6A/U double shield 75 ohm	25¢/ft.
RG55AU (RG223) double silver shield 50 ohm	85¢/ft.
RG58U mil spec 96% shield	11¢/ft.

LOW LOSS FOAM DIELECTRIC

RG8X (Black, White, or Grey) 95% shield	$13.95/100 ft.
RG8U 80% shield	18¢/ft.
RG58U 80% shield	07¢/ft.
RG58U 95% shield	10¢/ft.
RG59/U 100% foil shield TV type	07¢/ft.
RG8U 97% shield 11GA (Equiv-Beldon 8214)	31¢/ft.
ROTOR Cable 8 Conductor (2-16GA/8-22GA)	19¢/ft.

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PL-259 push-on adapter shell	10/$3.89
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Double Male Connector	$1.79
PL-258 Double Female Connector	98¢
1 ft. patch cord w/RCA type plugs each end	3/$1.00
Reducer UG-175 or 176	10/$1.99
UG-255 (PL-259 to BNC)	$3.50
Elbow (M359)	$1.79
F59A (TV type)	10/$1.99
UG 21D/U Amphenol Type N Male for RG8	$3.00
UG-273 (BNC to PL)	$3.00
3/16 inch Mike Plug for Collins etc.	$1.25

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AMSAT Emphasizes 10 Meter Cooperation

With the launch of USSR amateur satellites RS3 through RS8, interference to satellite downlinks from non-satellite users in the band 29.3–29.5 MHz has become an increasing problem. The problem was especially bad during the recent winter, when high MUFs brought the contention for frequency resources in the 10 meter band to an all-time high. Even during the summer months, however, sporadic-*E* propagation can cause significant problems to those involved in satellite communications.

AMSAT, in a recent issue of *AMSAT Satellite Report,* was quick to point out that satellite users must avoid the presumption that they "belong" in the satellite sub-band. Further, when operators not involved in satellite work stray into the 29.3–29.5 MHz sub-band, AMSAT members were encouraged to explain the nature of the interference problem to these operators in a rational and unemotional manner.

In sum, while the decline of the sunspot cycle should reduce the competition for frequencies on the 10 meter band, operators are encouraged to avoid transmitting in the satellite sub-band so as to minimize interference to the weak signal work now ongoing there.

Commission Issues Order Of Revocation And Suspension To Morin And Boucher

Late in January 1982, the FCC, by order of James C. McKinney, Chief, Private Radio Bureau, *revoked* the license for amateur radio station K4MME which had been granted to Leonard R. Boucher. Boucher's Extra Class operator license was also suspended for the remainder of the license term.

In the same action, McKinney ordered that the Extra Class operator license of Gerard J. Morin, W1GM, be *suspended* for one year. Morin's operator license was also *modified* for the remainder of the license term to prohibit radio operation between the frequencies of 14.295 and 14.330 MHz.

The actions noted above were taken following complaints from participants in the Maritime Mobile Net that Boucher and Morin were deliberately and maliciously interfering with the operations of the Net. In one case, Boucher and Morin's actions seriously delayed the U.S. Coast Guard in California from obtaining assistance from the Net.

In closing its action on the two individuals involved, the Chief of the Private Radio Bureau noted: "Interference in any radio service is a serious matter. Boucher's conduct vividly demonstrates that he is unfit to be a Commission licensee. Revocation of his station license is not only warranted, [but] it is essential to the Commission's regulatory responsibility. Morin's conduct deserves a substantial suspension of his operator privileges."

Commission Enters Into Consent Agreement With Amateur

In late January 1982, the FCC entered into a consent with Richard K. Eastman, N5FX, following the Commission's order for Eastman to show cause why his amateur radio station license should not be revoked and his Extra Class amateur operator license not be suspended. The issues involved included alleged interference with the operations of other amateur operators and a question as to whether Eastman had the requisite qualifications to remain a Commission licensee.

In the agreement, Eastman agreed not to deliberately interfere with communications of other amateur operators and to operate his station in accordance with the amateur rules.

It is interesting to note that Eastman's public service activities carried out by means of amateur radio and his assurances of compliance with the Rules made a formal hearing in the matter unnecessary.

Processing Under FCC Environmental Rules Proposed For Applications Exceeding Federal R.F. Standards

The Commission has proposed to apply its environmental rules to processing of applications for authorization of equipment and transmission facilities which would exceed federal health and safety standards for radio frequency (r.f.) and microwave radiation. The applications affected would be those for:

- Authorization of equipment which exceeds emission standards set by federal agencies with health and safety jurisdiction, such as the Food and Drug Administration;

Say You Saw It In CQ

● Construction permits and licenses to transmit in any service which would result in exposure of workers or the public to radiation levels exceeding federal standards.

The Occupational Safety and Health Administration (OSHA) has established an exposure standard for workers. The Environmental Protection Agency (EPA) has jurisdiction to set standards for exposure for the general public, but it has not done so. Until the EPA or another agency with jurisdiction sets standards, the Commission proposes to apply the OSHA workers' standard for exposure of the public.

Equipment and operations meeting the standards would be excluded from the environmental processing requirements and would not be affected by the proposed rule change.

For more information on the proposed rule changes, and on the deadlines for filing comments, contact Dr. Robert Cleveland, Office of Science and Technology, FCC, 1919 M St., NW, Washington, DC 20554 (telephone 202-632-7073).

Hams To Search For Extra-Terrestrial Intelligence

"It's hard enough to find intelligent life here in Washington," noted Senator William Proxmire as he led the fight to eliminate NASA's Search for Extra-Terrestrial Intelligence (SETI) program. The Senator, quoted in the *Fairfield County* (CT) *Advocate*, considered the two million dollar per year program an unnecessary luxury at this time, given the cutbacks being experienced by social programs.

All of this pretty much leaves the SETI program in the hands of ham operators, something which was mentioned by California astronomer Robert Bracewell. Bracewell, quoted in *Science 81*, was optimistic that aliens may have the resources to detect stray radio and television signals from Earth. For example, TV shows broadcast in 1950 have already travelled 175 trillion miles into space, far enough, perhaps, for aliens to detect them.

Only one question remains, however: Will an alien, on seeing the likes of U.S. television in the 1950s, conclude that there is intelligent life on the third planet from the Sun?!

Correction On Note Regarding Reinstatement Of Previously Held Club-Station Licenses

In last month's column, we noted that the Commission would permit trustees of club and military recreation stations whose licenses expired between March 11, 1977 and late January 1982, to apply for reinstatement of their licenses. Last-minute changes in the FCC's order, however, resulted in a modification to the applicable time period. Specifically, trustees of club and military recreation stations for which the station license expired during the period March 11, 1977 and July 14, 1980 will have until June 1, 1982 to apply for reinstatement of their licenses.

FM Station Forced To Reduce Power

Cases of so-called television interference (t.v.i.) caused to Channel 6 signals by broadcast stations which operate at the low end of the f.m. band are legend. In a recent case, for example, irate viewers in Florida dynamited an f.m. station's tower to the ground when that station's broadcasts interfered with their TV receivers. Fortunately, before anything of the sort could happen in Lynchburg, VA, the FCC stepped in and forced WRVL to cut its power from 100,000 watts to 5,000 watts.

The station, located at the Rev. Jerry Falwell's Liberty Baptist College, has only a temporary authorization to operate. However, the FCC will probably hear WRVL's request for a full-time license by the time this column appears in print. Presumably, tests will have been run by now to determine the power level at which the station can operate without causing unreasonable interference.

Your Washington editor thanks Messrs. Dave Beauvais, KB1F, Vern Riportella, WA2LQQ (AMSAT), and Riley Hollingsworth, Esq. (FCC) for their contributions to this month's column.

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RG-213	27¢/ft
RG-8U foam, 95% braid	23.5¢/ft
RG-8X foam, 95% braid	11.5¢/ft
RG-59U mil spec	9¢/ft
RG-11U	19¢/ft
450 ohm ladder line, 100 ft roll	$10.25
8 conductor rotor cable	15¢/ft
14 Ga. Stranded Copper	(50 ft. mult.) 8¢/ft
12 Ga. Solid Copperweld	(50 ft. mult.) 8¢/ft
14 Ga. Solid Copperweld	(50 ft. mult.) 6¢/ft
8 Ga Solid Aluminum	(50 ft. mult.) 6¢/ft

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VAN GORDEN 1:1 Balun	$8.50
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B&W Traps 80/40m thru 10m	$25.65/pr
B&W 375 or 376 Coax Switch	$19.25
B&W 593 Coax Switch	$17.95
B&W 595 Coax Switch	$22.50

ROTORS

CDE AR-22	$51.45
CDE CD-45	$92.55
CDE HAM 4	$170.30
CDE TAIL TWISTER	$238.25

ANTENNAS

MINI PRODUCTS Mini Quad	$127.95
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a monthly feature by

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DX

NEWS OF COMMUNICATIONS AROUND THE WORLD

We few, we happy few,
We band of brothers;
For he today who works DX with me
Shall be my brother . . .

This is the Spring of the primaries. The land abounds with those men of proclaimed goodwill, those always firm of purpose and everlastingly concerned for their fellow man, even for DXers. Last week one of the Locals was up the hill, imbued with the flow of the season and grasping our hand firmly, his free hand pressing tight our elbows. The impact was overpowering; the steady eye contact was even more so. One needs strength when the office seeker is about. But this one came not to seek our vote, but to seek knowledge.

In turn, we firmly grasped his hand, our left hands clutching his upper arm just above the elbow. Our gaze was just as firm, compassionate yet seeking, for we had run this trace before. "What can we do for you?" we asked, careful to keep our tones deep and resonant. "What are your needs?"

The smile we received in turn was beautiful to see. Certainly this must be the great time of the year when so many are so solicitous for their fellow man. Only in November might the tide of compassion roll higher, and we don't mean the *CQ* WW DX Test. But we had this seeker of knowledge, this one with the beady-eyed smile, on our hands.

"I come to seek your advice," he said, and we were warm with his words. "I am frankly puzzled by something, and I am sure that one with your keen insight of DXing and your broad knowledge of things will be able to help me." We were sure we could at this point for who can help but melt a little when the winds of flattery blow strong.

"Tell us," we said, earnestness in our voice, "tell us what your questions are and perhaps we can help. His was a question often asked before.

"What is it about DXers?" this one asked. "Why is it that they start out usually dazzled by being able to talk with amateurs all over the world. Then soon you'll find them worrying about their DXCC totals, their status in the local DX Club, and inevitably their position on or their nearness to the Honor Roll. I've known nice guys who get close to the top and everytime they are on the air it is Armageddon now! Maybe you've noticed this?" We had to admit that in other times and other places we had noticed all of what he spoke and had also tried to explain it. We were not always successful.

77 Coleman Dr., San Rafael,CA 94901

"Old and young" JH1WKS (ex-J2IX), Suzy is a very old timer, having been on the air since 1933, and she is still active on the c.w. bands. Nana, JI1VLV, is a very active c.w. DXer, age 17, and she is a university student. (Thanks to JH1WIX and W2GT for this info.)

"You have to first understand," we said, "that DXing is an everlasting joy. There's really nothing else like it in amateur radio. But once you've worked a couple of hundred countries other factors start to gain in importance—things such as your DXCC total and your nearness to or your position on the Honor Roll." We leaned close to the questioner so he would not miss a word. "But of course you know all of this already, don't you?" we asked and his head nodded briskly.

"Of course I do," he said. "But all of what you've said has to do with the 'what' of DXing. I want to know the 'why.'"

We had already assumed that, but to know the "why" one first has to know the "what." So we continued.

"Somewhere along the way things often change in importance," we continued. "The simple joys of pure DXing are replaced in part by the desire to excel all other DXers in one's peer group as well as the ambition to excel everyone else. There is a desire to be admired by other DXers and many think that to achieve the Honor Roll is to ensure the preservation of one's memory for all eternity. And there are signs that the DX'ers pride of accomplishment is often almost overpowering." We again leaned close to this Seeker after the Eternal Truths. "Do you follow all of this?" we asked.

The head was just as brisk as ever in nodding. "I think I get it," he said, "and it sounds like a mixture of personal ego and a boundless desire to be remembered. Maybe that's it . . . ego and posterity."

We were delighted. This one had gone from square one to square sixty-four right before our eyes. This was impressive we were thinking. Perhaps we should have been a bit more cautious. But one learns . . . always.

We thought it time to relax. The pressure of expounding on the noble precepts was over. It was about this time that the Local one made his move.

"Speaking of posterity," he said somewhat offhandedly, "do you really believe that DXers are remembered for their high DX totals and their big scores in contests?" He was still quite earnest with his words, but later we thought that we should have paid more attention to the sideways look we were starting to note.

We had to think this over. Finally, we recalled the words once spoken about one of the truest of the true-blue DXers, Dave Baker, W6WX. "You are alive as long as you are remembered," we said, "and you are dead when you are forgotten. Years back there was a DXer who will be long remembered and that was W6WX. That's for sure."

The Local smiled and we felt a small moment of disturbance. Was that a trace of guile we were seeing in his smile? We cautioned ourselves to pay a bit more attention.

"I think you are absolutely right," the Local One said. "And undoubtedly there are DXers who feel very strongly about this. I've come up with something that I think will appeal to every high-total DXer and perhaps even you will be interested." Maybe at this point we should have thought of working in our heels for a bit of resistance, but the ball had started rolling and there was no stopping it. The Local leaned a bit closer, the low but steady note of confidence in his voice.

"I've come up with something that I think will probably fill a need in the DX world. The concept is new but the need is old. In short, I am offering every DXer, regardless of whether his DXCC total is low or high, a chance to memorialize his achievements for all eternity. To be brief, I have developed a plan which will supply, once the DXer becomes a Silent Key, a headstone with his callsign and his highest DXCC total!" There was a note of triumph in the Local's voice and he leaned close to make sure we did not escape. "Of course we are including all the deletions," he continued, "it only being fair and just to engrave on that finest polished

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The WPX Program

Mixed

973	ZD8RH

S.S.B.

1466	JH4MUQ	1470	OZ1BUR
1467	KC9DS	1471	WB5RQM
1468	W3ARK	1472	G4GED
1469	JA1FJF	1473	W3ILR

C. W.

2123	JA2FGL	2128	KD7H
2124	DL7FU	2129	SM5DAC
2125	JA2EGM	2130	DL1AM
2126	DK9LG	2131	VE2DPJ
2127	OZ1BUR		

Endorsements

Mixed: 450 W8RSW, K8HF. 500 W8RSW, NI4Y. 550 WB8JDA, W8RSW. 600 WB@LXM, W8RSW. 650 W8RSW, JA9FAI. 700 KO8T, WA3GNW, IS@MVE, W8RSW, JA9FAI. 750 W8RSW. 800 W8RSW. 850 W8RSW, N4IB. 900 W8RSW. 950 W8RSW. 1000 PY4OD, KL7AF, W8RSW. 1050 YU4HA, W8RSW, ON4XG. 1100 DJ4XA, YU4HA, W8RSW. 1150 YU4HA, W8RSW, ON4XG. 1200 WA4QMQ, DJ4XA, YU4HA, W8RSW, ON4XG. 1250 N4UH, DJ4XA, YU4HA. 1300 DJ4XA, YU4HA. 1350 YU4HA. 1550 N4NO, N2AC.

S.S.B.: 350 DC9DS, W8RSW, JA1FJF, WB5RQM, W3ARK, G4GED, W5ILR. 400 KC9DS, W8RSW, JA1FJF, WB5RQM, W3ARK, WA3GNW, W5ILR. 450 KC9DS, W8RSW, WB4VOO, W3ARK, WB5RQM, W5ILR. 500 W8RSW, DA1MV, KB9UG, W5ILR. 550 W8RSW, CT1BY. 600 W8RSW, CT1BY, WA2SRM. 650 W3GXK, CT1BY, 700 N4IB. 750 PY4OD, KC4OV, ON4XG. 800 DJ4XA, DC4OV, ON4XG. 850 DJ4XA, KC4OV. 900 DJ4XA, KC4OV. 950 DJ4XA. 1000 DJ4XA. 1050 I6ZJC. 1100 N4NO, I6ZJC. 1150 WA4QMQ, I5ZJC. 1300 W@YDB. 1750 K2POA.

C.W.: 350 W8RSW, DK9LG, KD7H, DL1AM, VE2DPJ. 400 W8RSW, DL1AM, N3KR. 450 W8RSW, SM6HCJ, DL1AM. 500 VE2FOU, W8RSW, N4IB, DL1AM. 550 W8RSW, AK9Z, DL1AM. 600 W8RSW, DL1AM. 650 W8RSW, DL1AM. 700 W8RSW. 750 W8RSW. 800 DJ4XA, W8RSW. 850 DJ4XA, W8RSW, ON4XG. 900 PY4OD, DJ4XA, W8RSW, ON4XG. 950 DJ4XA, W8RSW, ON4XG. 1000 DJ4XA, W8RSW, ON4XG. 1050 W8RSW. 1100 W8RSW. 1150 W8RSW. 1200 W8RSW. 1250 W8RSW. 1300 W8RSW. 1350 W8RSW. 1400 W8RSW. 1450 W8RSW. 1500 W8RSW. 1550 W8RSW. 1600 W8RSW. 1650 W8RSW. 1700 W8RSW. 1750 W8RSW. 1800 W8RSW.

10 meters:	DJ4XA, W8RSW, WB5RQM, WA2SRM.
15 meters:	W8RSW.
20 meters:	W8RSW, K8HF.
40 meters:	W5UR, W8RSW, KA3A, DA1MV.
80 meters:	WA4QMQ, DJ4XA, W8RSW.
160 meters:	W8RSW.
Asia:	W8RSW, KC8CC, K7UC.
Africa:	DJ4XA, W8RSW.
Europe:	W8RSW, DK9LG, K8HF.
No. America:	JA9FAI, K1IJU, DJ4XA, W8RSW, K8HF.
So. America:	DJ4XA, W8RSW.
Oceania:	DJ4XA, W8RSW, JA9FAI.

Award of Excellence: W8RSW, WA4QMQ.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if air-mail desired) to CQ WPX Awards, P.O. Box 1351, Torrance, CA 90505-0351 U.S.A.

granite the full sum of accomplishments. Right?"

We were dazzled . . . or something. For a moment we were shaking our heads, not in disbelief, but to get our eyeballs back in their sockets. "Are you serious?" we had to ask, and the Local was all smiles.

"Of course I'm serious," he said, "and no one ever came up with an idea like this before. Think of how future generations of DXers can wander through the cemeteries and know that there lies a DXer and what his DXCC total was. Why you must see that this is an absolute guarantee that posterity will remember the DXer. And forever!!"

The initial shock of incredulity was wearing off, but indignation was surging. "All of this is ridiculous," we shouted, forgetting the deep and resonant tones. "You are trying to make a mockery out of DXing. It is one thing for us to sit and talk about what motivates DXers, their need for ego fulfillment and the desire to be remembered. But it is simply ridiculous to think that DXers would ever consider having their DXCC totals on their headstones. No way!! You'll never find any top-dog DXer even listening to your proposal. All they'll do is laugh at you, you and your ridiculous idea!"

If we had thought that we could crush this Local with words sharpened with the heat of indignation we were wrong. All we got was another beady-eyed smile.

"Look," he said, "even you admitted that DXers are concerned about being remembered for posterity. Right? And even you talked of their need to feed their egos, right? So why do you say the idea won't sell? Why?"

Perhaps we should have kept quiet, but we could not. "Because the whole thing will never fly," we shouted. "DXers are not so stupid that they'd buy an idea like that. Never!!"

If we had thought that we might have the last word in the matter we were headed for disappointment. There was a light in the eyes of the Local and the turned up corners of his mouth could hardly be described as anything but a triumphant smile. "You think so?" he asked. "Well, at the last club dinner meeting I sort of let the idea drift out during the conversation at our table, maybe even a bit more over a few drinks, and before the meeting was over I'd signed up eleven applicants. Eleven! mind you, and the idea has yet to see daylight. When we open the doors to this plan the demand will be tremendous. And it will never end, for DX and DXing go on forever. Right?"

What does one say when in a situation such as this? There are those things which are inconceivable and those sacred tenets which should never fail. But many a DXer will hope to be remembered by posterity and having one's total engraved in granite may be the way to ensure the record of what may be their greatest accomplishment.

Or is it that when there is a way to work on a DXer's ego a volunteer will be ready? Perhaps we will have to wait for another day to ponder another of the Mysteries of the Ages, possibly even why a fellow on the Honor Roll will put up a massive antenna array in the hope of ensuring that he will catch the few he still needs. Or maybe why few DXers can name off-hand the top ten W/K/A/Ns on the Honor Roll. There are yet many abstruse DX mysteries to plumb and some days it seems that there are even more.

San Pietro Island

San Pietro is in the Ionian Sea, part of the Cheradi group, and a group of Italian amateurs out of Taranto will be there from May 28th to June 2nd.

While this will not get you running

CIRCLE 65 ON READER SERVICE CARD

CQ Awards Check-Points

It is realized that DXers are often faced with the question: "Now that I have it, what do I do with it?" When it comes to the various *CQ* Awards, you can quickly figure out how to get the cards checked if you keep the following handy. Clip this info out and save it.

Check Points in the U.S. and Canada

W1DA	Maine
W1AM	New York
W1WY	Connecticut
K2FL	New Jersey
W2GT	New Jersey
W2LZX	New York
K2EEK	New York
WB3DNA	Harrisburg, PA
K4XO	Germantown, TN
W4WJ	Miami, FL
AE4Q	Georgia
N4MM	Virginia
W4UG	Virginia Beach, VA
N4NO	Alabama
AA4FF	Lynchburg, VA
K4IIF	Florida
N4UF	Jacksonville, FL
K4SE	Jonesboro, TN
W4WJ	Miami, FL
W4KA	Cape Coral, FL
AI5I	Dallas, TX
K5OA	Louisiana
N5JJ	Houston, TX
K5UR	Arkansas
K6NA	San Diego, CA
N6AV	Southern California
W6RJ	Northern California
K6ZDL	Torrance, CA
WB6SHL	Westminister, CA
N6AR	Canoga Park, CA
N7YL	Las Vegas, NV
W7OM	Seattle, WA
W7XN	Portland, OR
W8LFO	Lorain, OH
W8IMZ	Dayton, OH
K8LJG	Flint, MI
W9LT	Ft. Wayne, IN
W9DWQ	River Forest, IL
WØSFU	Minneapolia, MN
KØJSY	Cedar Rapids, IA
WØKU	Denver, CO
VE1RY	Riverview, New Brunswick
VE3GMT	Toronto, Ontario
VE7AFY	Ruskin, British Columbia
KL7PJ	Anchorage, Alaska
KP4AM	Puerto Rico
KH6DD	Hawaii

Check Points Overseas

Europe

DL3RK	West Germany
F6CTR	France
I8KDB	Italy
Box 88	Moscow, Russia
HB9DX	Switzerland
9H4H	Malta
OH2PQ	Finland
OK1DKR	Czechoslovakia
SM5DQC	Sweden
LA5QK	Norway
PAØMOD	Netherlands
OZ1WL	Denmark
YU2RVS	Yugoslavia
G3FKM	England
EA3AOC	Spain
SP5BB	Poland
TF3AC	Iceland
DJ8SW	Germany

Other Countries

VK6JS	Australia (west)
VK3NDY	Australia (east)
LU1DJU	Argentina
PT2VE	Brazil
CE6EW	Chile
XE1ZE	Mexico
ZL2GK	New Zealand
HM1AS	Korea
JF1FRD	Japan
4S7DA	Sri Lanka
ZE2JE	Rhodesia/Zimbabwe
S8AAP	Transkei
CX7BF	Uruguay

breathlessly to catch a new one, it will count towards some awards. The callsign will be IJ7ET. The group will operate h.f., v.h.f., u.h.f., s.h.f., and OSCAR with c.w./s.s.b./RTTY. Look for them to be particularly active during the c.w. portion of the *CQ* WW WPX C.W. Test.

QSLs will be handled by I7SOZ, P.O.B. 136, I-74100 Taranto, Italy. Should you want further information, drop a quick line to Luca Mori, I7LMR, POB 514, I-74100 Taranto 12, Italy.

While we're in this quadrant, it might help to note that the Italian prefixes do indicate various areas, those with a single letter in the prefix being on the mainland, and those with two letters on the islands. For example:

IØ	Lazio, Umbria Regions
I1	Liguria, Piemonte
I2	Lombardia
I3	Veneto
I4	Emilia-Romagna
I5	Toscana Region
I6	Abruzzi, Marche
I7	Puglia, Basilicata
I8	Calabria, Campania Molise, Basilicata

and the islands—

IT9	Sicily
ISØ	Sardinia
IX1	Valle d'Aosta
IX3	Trentino, Alto Adige
IV3	Friuli, Venezia Giulia
IA5	Isole Toscane
IBØ	Isole Ponziane
IC8	Isole Napoletane
ID9	Isole Eolie
IE9	Isola Di Ustica
IF9	Isole Egadi
IG9	Isole Pelagie
IH9	Isola Di Pantelleria
IJ7	Arcipelago Delle Cheradi
IL7	Isole Tremiti
IMØ	Isole Minori della Sardegna

Delta Division Convention

This will be held May 22–23rd at Knoxville, Tennessee during the International Fair which opens there in eastern Tennessee this Spring. The Radio Club of Knox County is working to ensure that amateurs find something of interest during the exposition and Delta convention later this month, even going to the extent of bringing in some well-recognized names for the amateur activities, these including Vic Clark, W4KFC, who will talk on "The Future of Ham Radio." Don Search, W3AZD, will be there from the ARRL DXCC Desk to field all sorts of questions at the DXCC Forum. When not handling the hot questions W3AZD will be around and available for other DX matters. Bob Dixon, K4MQG, will conduct a 5BWAZ Forum, while Bob May, K4SE, will be on hand to verify cards for WAZ. Even the K4/N4/W4 QSL Bureau will be on hand and if you notify them by April 20th . . . or a bit later, perhaps, should this word be a bit later . . . they will bring any accumulation of incoming QSLs for personal delivery.

There will be exhibitors as well as representatives of various amateur activities. *CQ* will be in attendance. And if you need a bit more information, get in touch with Steve Kercel, Rt 4, Box 114, Knoxville, Tenn. 37865. The days are short until things open in eastern Tennessee, Knoxville being known as the Gateway to the Great Smokies.

Scotland—GB4GM

The Clyde Valley DX Group, a dedicated band of DXers out of Strathclyde, are aiming for some sustained activity in August with a special callsign. There are four points from which they plan to operate, a special QSL card being printed for each operating stop.

Operating from south to north in Scotland, their stops will be:

Mull of Galloway	(south)
Ardnamurchan Point	(west)
Dunnet Head	(north)
Buchan Ness	(east)

At each stop two stations will operate continuously for forty-eight hours in the h.f./v.h.f. bands. In addition to the distinctive QSL for each operating stop, stations working them at all four places will receive an exclusive certificate. Gordon Hunter, GM3ULP, says that the certificate is the main reason for the activity and they want as many as possible to qualify for the award.

The exact dates have not been firmed for this August effort but it probably will be over the weekends during that month. The Scottish Tourist Board has been helpful in setting up the plans for this effort and there are several other organizations showing interest.

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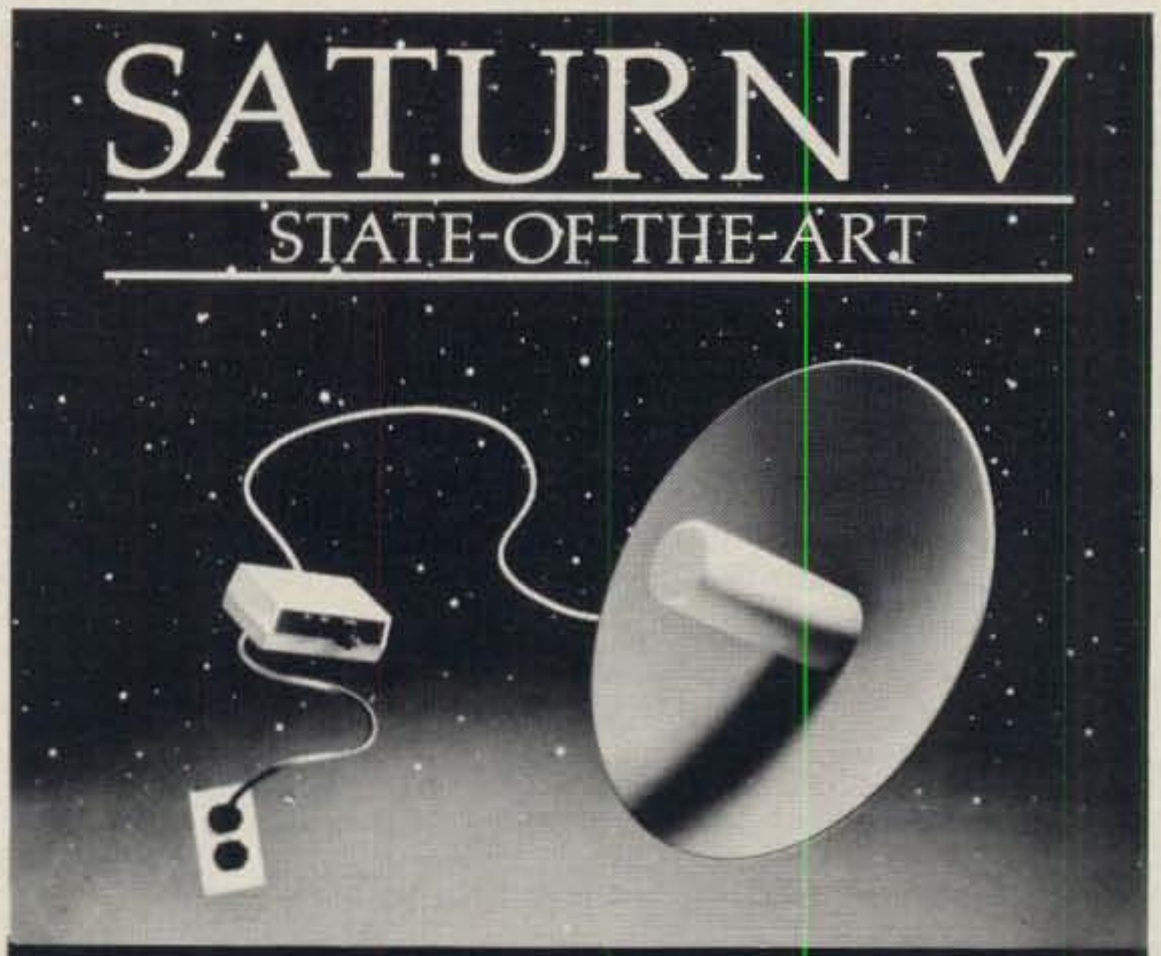

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CIRCLE 46 ON READER SERVICE CARD

Kiribati Cube

This being the period of puzzles, some DXers feel that with the changes in callsigns they have had early exposure to the enigmas. Those who may want quick answers to complex problems can sort things out on T30/T31/T32 by checking the following:

T30 Western Kiribati. Tarawa, Ocean, Makin. This was once VR1 territory; in the DXCC list it was VR1-Gilbert/Ocean Islands.
T31 Central Kiribati. This was the VR1-British Phoenix area, Canton and Phoenix being a couple of the major islands.
T32 Eastern Kiribati. Christmas Island-VR3 and the Line Islands make up this area.

If all of this is not enough, early on when these sparsely populated islands went independent, other callsigns were used. T3A and T3K were used in the T30 area, T3P was heard in the T31 islands, and T3L in T32. How does one get all of these sorted out? John Minke in *World Radio News* did it.

The Colvins

Early in January Lloyd and Iris were in Guyana signing W6QL/8R1 and they ran up some 9000 QSOs, c.w. and s.s.b., working ten through one-sixty. They report that it took three weeks to get operating permission in Guyana, the feeling being that they were the first ever to be allowed into the country to operate solely as a DXpedition.

After winding up the operation in Guyana, the Colvins headed for Surinam where they were planning to sign W6KG/PZ1. They plan to continue to alternate between Lloyd's call, W6KG, and Iris's call, W6QL, as they follow the DXpedition route. They believe that this facilitates QSLing through the YASME Foundation. Should you work the Colvins on any of their stops, all QSLs go to YASME at POB 2025, Castro Valley, California 94046. Sase needed.

4U1ITU

This DXCC country in downtown Geneva is located at the headquarters of the International Telecommunication Union (ITU). The ITU is one of the oldest international organizations in existence, being founded in Paris in 1865.

Recently Wolfgang W. Wessely, DJ3TF, operated 4U1ITU. Actually, it was last Fall, but his experiences there and an explanation of the requirements and operating routine may be of more than passing interest to any traveling type who may be in the Geneva area this summer.

Paco La Fuente, EA2ADO, is the station manager. DJ3TF arrived at the headquarters building at midnight but it was still possible to make arrangements to operate, as plans were made in advance. 4U1ITU is available around the clock and most times you can get permission to operate upon presentation of your home license.

Wolfgang W. Wessely, DJ3TF, at the operating position at 4U1ITU. DJ3TF operated 4U1ITU last Fall from October 30th to November 2nd. His report in this month's DX column will give a bit of information on how 4U1ITU operates and what you might start thinking about should you be headed for Geneva this summer.

The gear at the station includes a Collins KWM2, a Yaesu FT-901, a Kenwood TS-130V, and a TS-830 with a linear. There is a three element Fritzel beam plus a three element Swan. On 40/80 there are inverted Vee dipoles and a ¾ sloper dipole for 160.

What is it like to operate 4U1ITU? You'll get a lot of attention . . . always. Wolfgang says that there are always a lot of W/Ks and JAs wanting to work 4U1ITU but there are always a lot of other countries in the mix, many looking for another counter for DXCC or 5BDXCC. During his operation all the call areas in the W/K, JA, ZL, VK were worked on 40 meters.

There is the background information. And if you worked Wolfgang, DJ3TF, during the period October 30th through November 2nd when he was running up some 3K + QSOs at 4U1ITU, you can get your 4U1ITU QSL from him at POB 129, D-8450 Amberg/Opf. West Germany. The accompanying photo shows Wolfgang at the 4U1ITU operating position. He wants it to be noted that he can only QSL for the dates above. He also wants to thank the Northern California DX Foundation for assistance.

Some Quick And Slippery DX Notes

WB6GJF passes along the new and correct address for the Radio Society of Okinawa, this coming from KA6AA. It goes to: Radio Society of Okinawa, Box 217, Torii Station, APO San Francisco 96331. This also includes their QSL service.

Bill Jones, N8BKF, says that he is no longer connected with the J87RS effort at St. Vincent Island last August and that any queries for outstanding QSLs should be sent directly to Bob Storch, N8BNF, in Millington, Michigan. The Call Book may be inaccurate due to recent changes of QTH.

The WAZ Program

10 Meter Phone

179	AC0A	181	JA8WQE
180	JA8RWU		

15 Meter Phone

116	JE1QYI	119	G4CHP
117	N4IB	120	K7OH
118	AC0A		

20 Meter Phone

392	YU2HDE	393	AG9S

10 Meter C.W.

30	DL1LZ	31	K0ZZ

80 Meter C.W.

2	K5UR

All Band WAZ

S.S.B.

2362	VE6CBX	2373	KN0QJY
2363	WD4KXB	2374	WB3IET
2364	N6VO	2375	WD6EQP
2365	JA6AZQ	2376	SM7AZL
2366	W1DOH	2377	SM5WS
2367	DK4CQ	2378	KB9KV
2368	DL7KB	2379	WA2SRM
2369	EA7FP	2380	A4XIU
2370	WB2ZEL	2381	OE8MOK
2371	DF8FD	2382	DK6EL
2372	DM2BFK		

C.W. and Phone

5286	9V1TL	5298	W1GY
5287	HS5HS	5299	N7AM
5288	N0BFP	5300	WA2JOC
5289	W2IY	5301	W3DDG
5290	DL9PO	5302	W1VH
5291	W7HZL	5303	W4SYY
5292	KA3R	5304	N3KR
5293	KC7E	5305	AI3E
5294	W2XL	5306	AI3Y
5295	KB7OD	5307	UA3GEA
5296	K4SE	5308	DK1QC
5297	W3HDH	5309	DF2IC

All Phone

577	F8BO	578	DK6IM

Applications and reprints of the latest rules may be obtained by sending a self addressed stamped envelope (37 cents) size 4½ × 9½ to the W A Z Manager, Leo Haijsman, W4KA, 1044 S.E. 43 Street, Cape Coral, Florida 33904. Applicants forwarding QSL cards either direct to the W A Z manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all C.Q. awards is $4.00 for subscribers and $10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest *CQ* mailing label with your application.

The IV Trophy His Majesty The King of Spain Test was due the last weekend in April and a number of awards and trophies are available for what is an annual effort. Seventy-five Test EA-QSOs will bring you the commemorative award; under 75 will bring the special QSL. Logs should go to Radioaficionats Calella, Apartado 181, Calella (Barcelona) Espana, by June 30th.

In early February there were reports that the Peoples Republic of China magazine *RADIO* contained in the January issue an article indicating that amateur radio was, or would be, legal in mainland China. The information was relayed by one proficient in the Chinese language who reads the magazine and was quite definite on the information.

There were a number of qualifications and restrictions noted, but if all of this jells, there is a good possibility that a true-blue BY club station may be heard before long if not already.

As any DXer knows, one has to live in hope. Sometimes it is hope that the one

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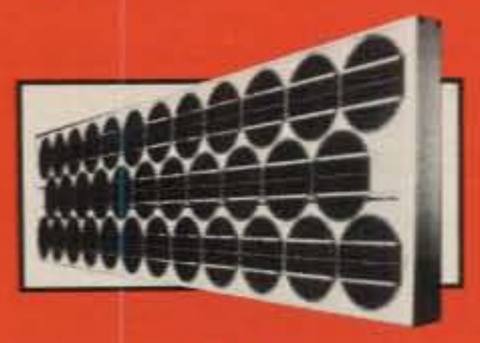

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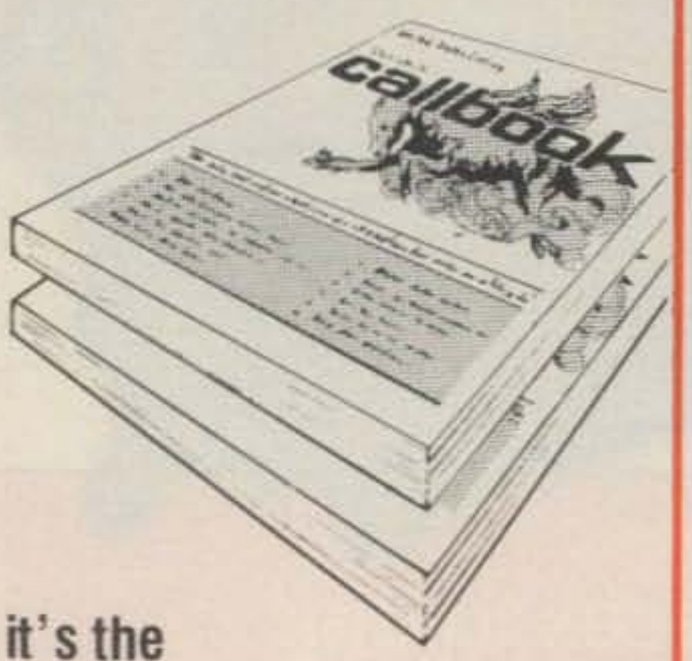

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CIRCLE 2 ON READER SERVICE CARD

5 Band WAZ

Standings as of February 1, 1982

All 200 zones worked:

1. ON4UN, John Devoldere (Belgium)
2. K4MQG, Gary Dixon (U.S.A.)
3. SM4CAN, Kent Svensson (Sweden)
4. AA6AA, Steve Orland (U.S.A.)
5. W8AH, Albert Hix (U.S.A.)
6. W6KUT, E. A. Andress (U.S.A.)
7. EA8AK, Fernando Fernande (Spain)
8. LA7JO, Stig Lindblom (Norway)
9. EA3SF, Fernando Blenert (Spain)
10. OH1XX, Hannu Nieminen (Finland)
11. EA8OZ, Julio Rosello (Spain)
12. W0SD, Edward Gray (U.S.A.)
13. K0ZZ, Gary Knutson (U.S.A.)
14. ON6OS, P. Michiels (Belgium)
15. OK3TCA, E. Melcer (Czech.)
16. K6SSS, Fred Capossela (U.S.A.)
17. ZL3GQ, Peter W. Watson (New Zealand)
18. OK3CGP, Stefan Melcer (Czech.)
19. SM0AJU, Leif Lundin (Sweden)
20. OZ3PZ, Preben Thomsen (Denmark)
21. I3MAU, Reno Mauri (Italy)
22. I2ZGC, Gianni Zillio (Italy)
23. 4Z4DX, Dov Gavish (Israel)
24. N4KE, Ron Blake (U.S.A.)
25. K5UR, Rick Roderick (U.S.A.)
26. K9AJ, Michael McGirr (U.S.A.)
27. SM3EVR, Tord E. Julander (Sweden)
28. LA5YJ, Bjorn Hugo Ark (Norway)
29. DL3RK, Walter Geyrhalter (W. Germany)

The top 10 contenders for 5 Band WAZ:

1. CT1FL, 198
2. I0RIZ, 197
3. K1MEM, 196
4. W8GT, 195
5. G3MCS, 194
6. N4RR, 192
7. LA9GV, 191
8. N6DX, 191
9. F6DZU, 191
10. LA9GV, 191

135 Stations have attained the 150 zone level

Members of the YU7GMN Radio Club had to make two trips to HB0-Liechtenstein before they ran up a satisfactory total of QSOs. Along the way they also found that deep valleys are not the best DXing spots. Here at Bergsrerestoran and over 6000 feet in elevation are from left to right, YU7QCC, YU7QEH, YU7QEF, and YU7PEF. Their home QTH is Muzlja.

you worked is the true-blue, legitimate BY and not the DX entrepreneurial Slim who often is there first to be worked but last with the QSLs.

Lester Price, ZL4PO/Chatham, wants it known that only Fred Poole, ZL4KI, will be the route for his QSLs during his current stay on Chatham. ZL4KI goes to P.O. Box 575, Invercargill, New Zealand.

Gerry S. Tynan-Blundun, sometimes known as "The Jungle Lion," has departed former Rhodesia where he signed ZE6JL and is now living in South Africa and signing ZS2JL. He is living in Gonubie and working as an instrument engineer for Telefunken.

Gerry did not write just to tell us that he had moved, but rather to express concern that in recent years some inbound QSLs may not have reached him. He still has a thousand or so ZE6JL QSL cards on hand and would be happy to forward one if your QSO is in his log and you include either an IRC along with your sae or an sase. The current address for ex-ZE6JL is: Gerry S. Tynan-Blundun, ZS2JL, Box 113, Gonubie, Republic of South Africa 5256.

The YU7GMN Radio Club in Muzlja, Yugoslavia, made a couple of trips to HB0-Liechtenstein during the last year, the thinking being that some DX activity would help with the initial organization of their club. And what DXer would ever disagree with such logical and right thinking?

In August they made their first effort and found, as other DXers have, that operating from a deep valley is hardly conducive to a high QSO total, and they ran up but 600 QSOs. Low power hardly helped get their signal out.

With little action, they spent some time scouting and patrolling and talked with HB0ALO who guided them to Sareiserjoch, possibly the highest place with electrical power in the country and a site with a clear shot in all directions.

So they tried again in September. YU7PEF, YU7QCC, YU7QEF, and YU7QEH were back at Sareiserjoch and in seven days ran up 8000 QSOs using YU7PEF and YU7QCC's calls. They made DXCC for both calls and also 5BWAC. If you worked these calls /HB0, QSL to YU7GMN-Radio Club, P.O. Box 5, 23206 Muzlja, Yugoslavia. An sase or sae/IRC is needed.

St. Lucia/Martinique

A determined group out of Oak Ridge in Tennessee were aiming for a two-pronged operation from April 24th to May 2nd. The plan was to open with J6LTA or their home call plus /J6L on April 24th and run all bands, ten through one-sixty, to April 28th. Then it was on to Martinique where K4LTA/FM0GUJ, KR4C/FM0GUK, NR4S/FM0GUL, NC4U/FM0GUI and WA4CDH/FM0GUN would be the callsigns. All of this may help in QSLing. They go to the home QTH of the individual you worked. Sase or sae/IRC needed. Those without will be sent via the QSL bureau.

CQ DX Awards Program

S.S.B.

1091	KB3OQ	1096	AG1K
1092	W6NLG	1097	JR4MUK
1093	KB9KV	1098	G3RRM
1094	VE3BDE	1099	A4XIU
1095	KØREF		

C.W.

518	G3PSM	520	NL7G
519	VE3DTR		

S.S.B. Endorsements

310	F9RM/317	275	AI5I/291
310	N4WF/314	275	N2AQH/280
310	WØSFU/313	275	KB3OQ/275
310	K6JG/316	250	WB5PBA/266
310	K9MM/312	250	W6NLG/260
310	OE3WWB/310	250	K9TI/258
310	N6AW/310	200	AG1K/234
300	WØSR/307	150	KB9KV/161
300	WA4JTI/303		

C.W. Endorsements

310	W6PT/319	275	WØSR/285
310	K6JG/312	275	W4BV/280
310	K9MM/311	150	NL7G/183
275	K1MEM/295	150	N8BJQ/158

With the addition of SMOM, the total number of active countries is now 319. The basic award fee for subscribers to CQ is $4. For non-subscribers, it is $10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are $1.00. Updates not involving the issuance of a sticker are made free when an s.a.s.e. is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply.

5BWAZ #26

Michael J. McGirr, K9AJ, an M.D. living in Crete, Illinois was the 26th amateur to gain the 5BWAZ, working the forty zones on five bands.

An Extra Class license holder, he was first licensed in 1963 and has held the calls WB2JYN, WB9SOR, and since 1977 K9AJ. He prefers to work c.w. but will try a bit of s.s.b. should it mean a new one or a needed counter. K9AJ also has 5BDXCC.

Mike runs a Drake T-4XC transmitter along with the Drake R-4C receiver. An Alpha 77D linear is used to enhance the signal when needed. Antennas include a 6-el KLM beam at 72 feet for 10 meters, a 6-el KLM beam at 85 feet for 15, a 5-el KLM at 90 feet for 20 and a 2-el Telrex at 100 feet for 40. On 75 meters it is a HY-Tower vertical with 18 ¼wave radials and on 80 meters it is a Delta loop, fed at a corner with the apex 85 feet up.

Married, the XYL is named Susan, and with three children, Mike practices medicine in Chicago Heights. He is also an examiner for the American Board of Emergency Medicine. He is certified by the American Board of Emergency Medicine. He attended Seton Hall College in New Jersey as well as the Hahnemann Medical College in Philadelphia and the University of Chicago medical school.

Mike says that he works on his own in chasing DX, and that the most difficult part of the 5BWAZ was working the Central Asia zones on 80 meters. The last QSO to complete the two hundred countries for 5BWAZ was 4S7MX, this one on eighty and Mike worked it without a schedule on November 22, 1981. Actually a schedule had been set up for a couple of weeks later, when they met in an unplanned QSO prior to the planned time. The last QSO to show was from UA9OBG for Zone 18, this showing in his Christmas stocking.

Mike belongs to the Northern Illinois DX Assn. and works the DX tests occasionally.

Dr. Mike McGirr, K9AJ, is the winner of 5BWAZ No. 26. Primarily a c.w. operator, Mike will stray into the s.s.b. areas when something interesting or needed shows. A member of the Northern Illinois DX Assn., Mike says that the Central Asia areas were the hardest to work for 5BWAZ and especially on 80 meters.

QSL Information and Assorted Stuff

A4XJO to WB3JRU
CO7AM to EA1QF
FK6CR to F6EWK
FMØGUI to NC4U
FMØGUJ to K4LTA
FMØGUK to KR4C
FMØGUL to NR4S
FMØGUN to WA4CDH
IJ7ET to I7SOZ
J87RS to N8BNF
OE6MBG to WA1OER
PY1RR to PY1AA
TG9WB to WB2JVP
UO5OBE to YO5CT
VK9NYG to VK6NE
W6KF/PZ1 to YASME
ZE6JL to ZS2JL
ZL4PO/C to ZL4KI
6E5MX to XE2MX
6W8DY to VE4SK
W6QL/8R1 to YASME
K9LA/V2A to NØDH/7
K9MK/V2A to K9MK/5
K9DX/V2A to NØDH/7
N9PI/V2A to NØDH/7
K9MK/VP2M to NØDH/7
N9PI/VP2M to NØDH/7
V2AMK to NØDH/7
EA8AAY to Box 850, Las Palmas, Canary Islands
PZ1AP/1 to Box 566, Paramaibo, Brazil
5W1DQ to Graham Fuller, General Delivery, Apia, Western Samoa
K9MK/5 to Michael Krzystyniak, 6061 Dunson Ct., Watauga, Texas 76148
NØDH/7 to Dave Henderson, 2031 East Gary, Mesa, Arizona 85203

W1KGH, ex-VO2G, has logs prior to 1949 should there be any of the Deserving DXers looking for a QSL a third of a century overdue. W9LNQ is looking for any Old Timer who might give some idea on how to get a QSL for 4W1AA in 1963.

And for those who need help with cleaning up the backlog of incoming QSLs, here are a few volunteers for QSL Manager duties . . . Norm Waltho, VE5AE, 1547 Glendale Street, Moose Jaw, Saskatchewan, Canada, and Doug Conrad, VE1ZL, Box 306 Armdale Post Office, Halifax, Nova Scotia, Canada.

73, Cass, WA6AUD

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries for the mode indicated. The ARRL DXCC Countries List is used as the country standard. Honor Roll listing is automatic when submitting application or endorsement for 275 or more countries. To remain on the CQ DX Honor Roll, annual updates are required. Honor Roll updates may be made at any time, in any number. Updates indicating "no change" will be accepted to meet the annual requirement. All updates must be accompanied by an SASE for confirmation. The fee for endorsements involving the issuance of a sticker is $1.00. The basic award fee is now $4 for *CQ* subscribers and $10.00 for non-subscribers. Please attach your latest *CQ* mailing label to qualify for the $4.00 rate.

C.W.

W6PT	319	W6ID	315	W1NG	305	N4MM	298	K9QVB	281
ON4QX	317	N6AV	314	W4OEL	305	K1MEM	295	N5DX	280
DL7AA	317	K6JG	312	W2GT	304	WA8DXA	294	W4BV	280
W3GRS	317	K4CEB	311	DL3RK	303	JA1GTF	285	OK1MP	279
W9DWQ	316	K9MM	311	K3FN	301	WØSR	285	WØIZ	278
K6EC	315	W4BQY	310	DJ7CX	300	SM3EVR	284	W1WLW	276
N4PN	315	N6CW	309	N6FX	298	JH1VRQ	281	I3OBO	276

S.S.B.

K2FL	319	K9LKA	315	N6AW	310	IV3YRN	298	VE3IUE	280
W6EUF	318	ZL3NS	315	N4KE	309	AI8S	297	WDØBNC	280
W4UG	318	VE3GMT	314	N6AV	309	VE3GCO	297	KB8O	280
K6WR	318	SM6CWK	314	DL6KG	309	W6DN	297	I8KCI	280
W3GRS	318	I8YRK	314	W2SUA	309	W1LQQ	297	XE1OX	280
W9DWQ	318	I4ZSQ	314	YV5DFI	308	K8CMO	296	4Z4DX	280
W3NKM	317	F2MO	314	WØYDB	308	I8LEL	296	KP4EQF	280
DL9OH	317	OZ3SK	314	VK4VC	308	I6PLN	295	N2AQH	280
K8DYZ	317	K4MQG	314	WØSR	307	WA4LOF	295	WD8MOV	279
W6REH	317	N4WF	314	XE1J	306	IØMBX	295	WB4UBD	279
XE1AE	317	SM6CKS	313	XE1KS	305	WD8MGQ	293	K8HV	278
W4EEE	317	EA4LH	313	LU1BAR/W3	305	JA5PUL	292	K3MWV	277
W2TP	317	YV1KZ	313	WA4WTG	305	WB1DQC	292	KC8JH	277
IØAMU	317	W4DPS	313	W1NG	304	ZL1BIL	291	WB3DNA	277
W9JT	317	OE2EGL	313	OK1MP	304	AI5I	291	WA6TOO	276
WA2EOQ	317	DK2BL	313	G4CHP	304	I3OBO	291	K1WJ	276
W9QLD	317	WØSD	313	WA4JTI	303	YU2RTW	288	WA4TLI	276
ZS6LW	317	WØSFU	313	N2SS	302	K9UAA	288	XE1CI	276
F9RM	317	W6YMV	312	K8PYD	302	VE3IPR	287	KB8KW	276
VE3MR	316	I5WT	312	N5FG	302	W4BQY	286	KB5FU	276
TI2HP	316	W3GG	312	W6FET	301	WB3HAZ	286	KKØC	276
VE3MJ	316	ZL1AGO	312	K9SM	301	AE5B	285	KD8DB	276
I8AA	316	N4MM	312	K9BWQ	301	CT1UA	285	WØKU	276
W9KRU	316	YV5AIP	311	VE3FJE	301	WA4DAN	285	K9QVB	276
I8KDB	316	K5OVC	311	W2CC	300	TG9EP	284	W8ILC/QRPp	275
W3AZD	316	VE7WJ	311	HP1JC	300	K9HQM	284	WAØTKJ	275
W3CWG	316	W6RKP	310	9H4G	300	SM4CTT	284	VE4AT	275
K6EC	316	K6XP	310	K1UO	300	W8IMZ	282	KØGT	275
VE2WY	316	W8ILC	310	DJ7CX	300	KA8T	282	K8VFV	275
K6JG	316	K9RF	310	K5DUT	300	WD9IIX	282	IØSSW	275
DJ9ZB	316	I3LLD	310	JH1VRQ	300	W8JXM	282	W6MFC	275
IØZV	315	K8LJG	310	LA7JO	299	I5BDE	282	KB9KD	275
K6YRA	315	W9SS	310	W7OM	298	N3RL	281	KB3OQ	275
W4SSU	315	OE3WWB	310	I8ACB	298	W2FGY	280		

No - 95 - 96

a monthly feature by
ADRIAN WEISS, K8EEG

QRP

THE ART OF VERY LOW POWER OPERATING

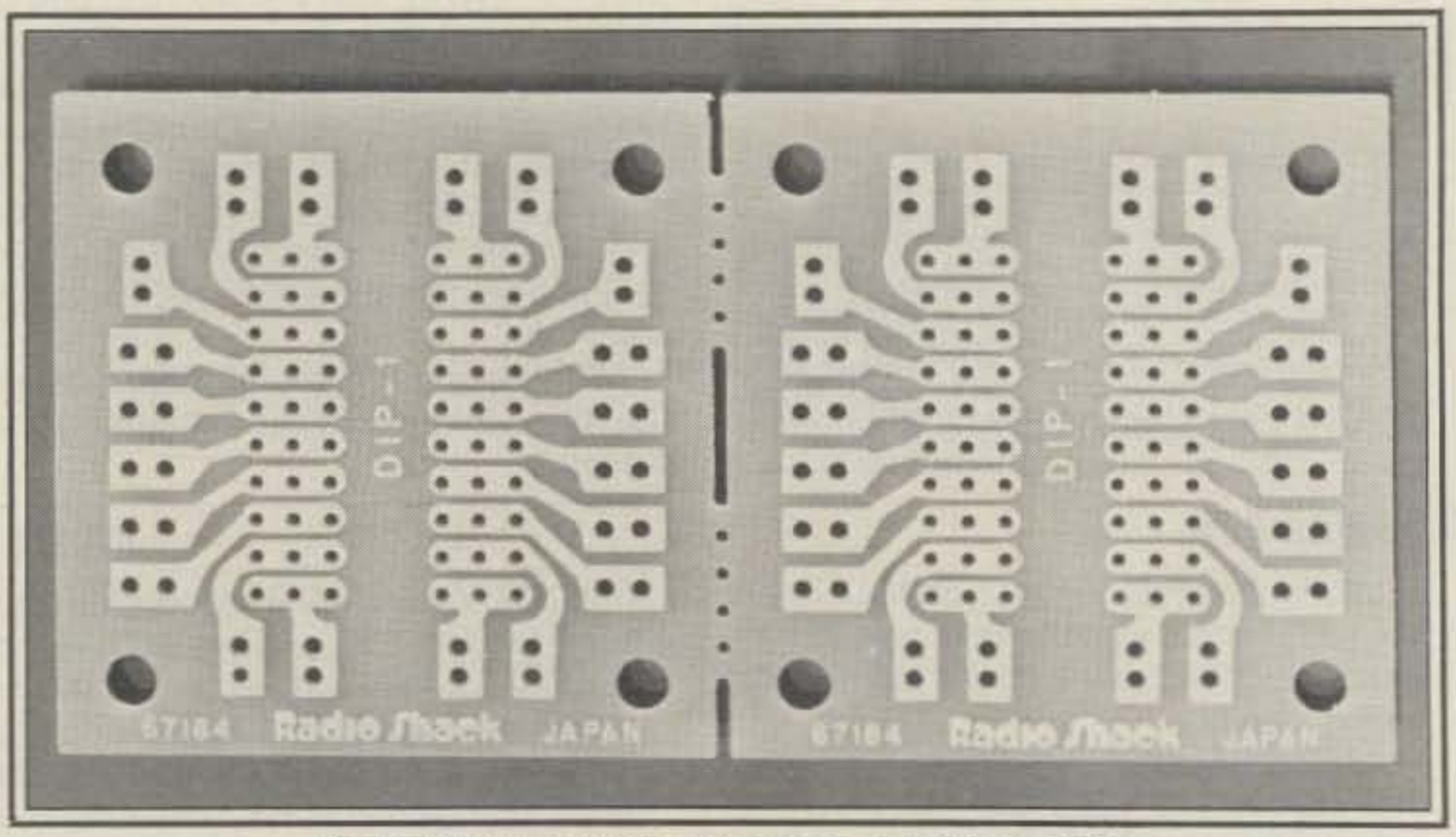
N0ARQ's Solution To The HW-8 R.I.T. P.C. Board Dilemma

Back in the *CQ* of October 1977, we published an R.I.T. (Receiver Incremental Tuning) circuit for the Heath HW-8 that has proven quite popular and successful. This article and the other two in the review-modification series have been available from me in reprint form for a while, and most requests for reprints include the question: "Is a printed circuit board, etched and drilled and ready to go, available anywhere?" Unfortunately, the answer had been "no" until N0ARQ came up with a solution which I wish I had discovered myself! Quite simply, he ran across a ready-made Radio Shack experimenters' p.c. board with a plethora of drilled holes and copper pads, and his idea is so good that it has to be shared with readers. Harold notes:

"For most lazy hams, building a special-purpose p.c. board is an onerous chore. You will find enclosed a schematic wiring diagram (see fig. 1) and sample p.c. board for construction of your R.I.T. circuit addition to the HW-8. I also enclosed an actual finished unit for your examination—hard to buy something without touching and feeling it!

"The features of the ready-made Radio Shack Archer p.c. board (Cat. No. 276-159) are impressive and for the HW-8 R.I.T. circuit layout, the following apply:

1. 20 paths (for 20 pin DIP) × 5 pads per path
2. 4 corner mounting holes (no drilling required)
3. 17 modes in K8EEG circuit board
4. 19 paths used (2 for Q1 source line and 2 for ground
5. 54 pads used and 46 still open
6. R1 vertical-mounted p.c.b. potentiometer slips mounts directly if third leg inserted into "top left" mounting hole
7. Only 2 jumpers required
8. Only two insulating sleeves required
9. Board layout visually similar to the published circuit schematic.



Radio Shack's dual in-line IC board (#276–159).

"It's a cute project and the use of the board eliminates the task of preparing and etching a board. Also this is a very economical approach—where else does one get 200 pads and 8 mounting holes done for $1.49? In addition, this board is only 65% the size of the special board shown in the original article—a considerable space savings. I hope this information helps promote use of the K8EEG R.I.T. circuit."

I believe that we all owe a debt of gratitude to N0ARQ for his suggestions. And it is obvious that the usefulness of this Radio Shack p.c. board extends far beyond the R.I.T. project—it is a really versatile board that I'll be using to breadboard other circuits. Fig. 1 shows N0ARQ's parts-mounting layout. The drawing is not intended to be an exact reproduction of the Radio Shack 276-159 board, but merely to show parts placement. One important note: **R*** is a final correction to the circuit printed originally. R* is a 220K resistor connected from the junction of D5-Q1 to ground. While N0ARQ mentions that only 2 jumpers are needed, note that one end of R1 (the end mounted in the "left top" mounting hole) requires a wire lead that travels half-way across the board. Finally, note that the pad configurations are slightly different for the two ends of the board. The proper end for mounting R1 is the end which has "Radio Shack" and a serial number etched on the pad-side of the board. With this board in hand, it ought to be possible to get the circuit assembled and adjusted in less than an hour.

Incidentally, reprints of the HW-8 Test Report, *CQ*, May 1977, and modification articles of August and October 1977, as well as a few other mods which have strayed into QRP literature, are available from me for $7.00. Proceeds above the cost of reproducing the articles are supporting the DXCC QRPp Trophy program which we've reported on in recent issues. Support is appreciated!

Operating Reports

I have to apologize to all of you who have sent in operating reports for publication in response to my requests in earlier columns. I know that operating reports columns are very popular and informative, yet I've managed to side-step them for quite a while. My excuse: writing the *QRP Handbook* has been absorbing an increasing amount of my time as the chap-

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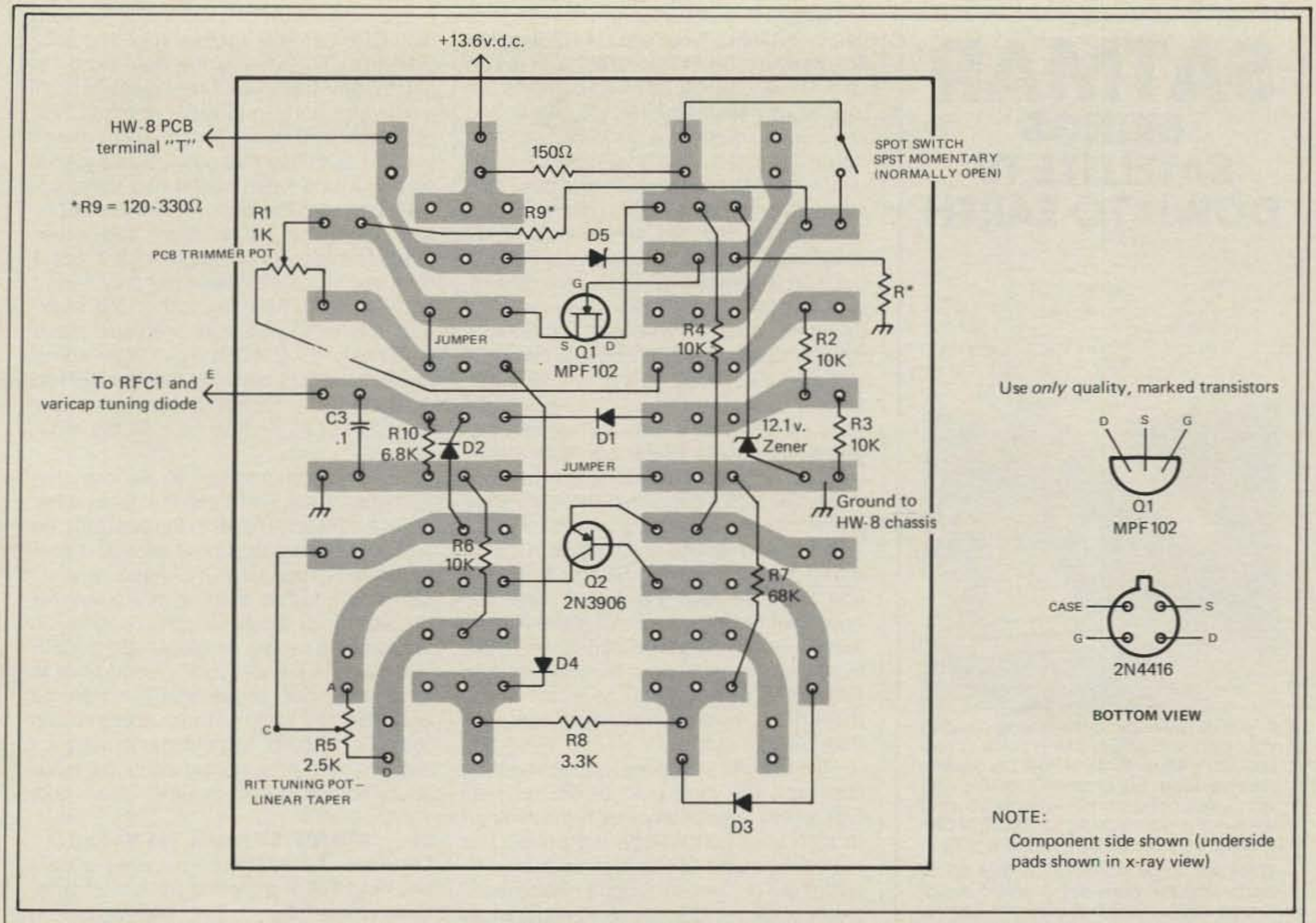

Fig. 1– The NØARQ construction technique for K8EEG's HW-8 R.I.T. circuit. The circuit is built on Radio Shack's "dual in-line IC board" (#276-159).

ters become more technical in nature, and I've just decided to do a good job so that when someone buys the book hoping to learn something, he won't be disappointed. Oftentimes, the section I'm working on absorbs all my time, I forget to eat, my girlfriend calls me and asks if I remember the color of her eyes (no, sorry . . .) and so on. but I feel that I'm writing the kind of book that I want to, that will help a lot of guys become more knowledgeable and successful QRP operators. We'll see! At any rate, it'll be out sometime this year, come hell or high water! Patience!

I also have to apologize for my failure to answer a whole stack of mail. Usually I can take care of the SASE queries on the spot—otherwise, it gets buried in the stack. So, let's get on to some reports—dated to be sure, but all reports are valid because they reflect what an operator does during a given time period and the radio conditions he's obtaining. Let's start off with a fellow a lot of QRP guys would like to work:

de . . . WL7AHR: "Want to congratulate you and thank you for your QRP work. You made me a convert even before I got my ticket! I had really planned to send you my FD 1980 log, but my first contest attempt did not pan out as planned. However, I was in there trying and will be in the running next year. Rig here is an HW-8. What a rig—sure am happy with it. It took me awhile but I got *CQ* back issues with your articles for modifying it. Still working on modifications (a never-ending de-bugging job!). Working QRP as a green Novice (with slow ear and key) from Alaska has not been easy, but would not trade the experience and challenge for anything! I have 16 states confirmed so far, all on 15 meters because of antenna limitations."

de . . . KH6CP, Zachary Lau, 2344 Pacific Heights Rd., Honolulu, HI 96813: "I have been fairly active with QRP during the past seven months and thought you might appreciate a report on my activities. I originally got an Argonaut 515 for the purpose of obtaining DXCC. After all, this little rig offered numerous advantages over my Heathkit DX-20/HR-1680 combo, including QSK, s.s.b., and almost instant band changing. With it, my total country total rose from the 80's to around 120 worked/79 confirmed. My homebrew antenna farm consists of a two element quad at 27 ft. for 10/15 meters, dipoles at 20 ft. for 20/40 meters, and a quarter-wave wire for 80 meters (have only worked KH6/KH3 on 80).

"I enjoy contesting, and have participated in just about every major contest in the past year with the exception of the *CQ* WW S.S.B. contest. My best efforts with QRP have been 258 QSO's in the WPX S.S.B., 184 QSO's in the WPX C.W., and 282 QSO's in the IARU Radiosport (mixed mode). The DX ARRL test was quite helpful in my current 50/46 WAS QRP effort, although contest contacts have only counted for a dozen or so toward my DXCC QRP effort.

"The rare DX that I have confirmed, for what it is worth, includes VK9 (Willis & Norfolk), FWØ, 4S7, 3B9, 3D6, and 7P8. Unfortunately, my location has very poor propagation to the north, as I live on the south side of a mountain range. As a result, there are many supposedly "easy" countries which I have not worked yet, like DL, G, F, etc. Since I will be attending the University of Pennsylvania for the next four years, hopefully I will be able to contrast QRP operation in two entirely different locations. I probably won't start another DXCC attempt, but will try to work some just the same."

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Example B,
Configured For:
Denver, Colorado

- Micro Scan 11-ft parabolic antenna with polar mount and electric remote LNA rotor
- Dexcel DXP-1000 receiver with built in modulator
- Dexcel 120°K Low Noise Amplifier
- Circular scalar feed horn

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de . . . KA8AKL, Rick Todd, 14470 Basslake Rd., Newbury, OH 44065: "Your articles on QRP finally convinced me that this is the way to go! Now all I have to do is find someone to give me a good trade-in deal for an Argonaut, or a good enough cash deal so that I can pick up a used one. With one watt out from my QRO rig, I managed to work MD, SD, NH, IA on 40, and K6, KH6, and KL7 on 10! Antenna is nothing but a ground-mounted 4BTV vertical without radials. Have an old 11 meter quad that loads up quite well on 10, and that's where most of my QRP work will be done. Hope to catch you on the bands sometime."

de . . . W1FK, Stew Gilmor, Spencer Rd., Higganum, CT 06441: "After being relatively inactive for almost 20 years, I got back on in late '76 with a borrowed HW-100. After a few months of looking around, I got a Triton IV and racked up DXCC with it. I ordered manuals for the SB200 & SB220, and then decided I'd rather heat my house with wood instead of plate dissipation! I've operated QRP during the ARRL FD 3 years in a row now. A few weeks ago I thought I'd try QRP in general . . . so, most of my operation will not be at less than 5 watts output.

"The whole list-taking, name-shouting business, the high cost of IRC/air mail QSL's, etc., has pretty well turned me off to high cost DX. What's the point? The nice thing about QRP is that it can be simply for our enjoyment. I don't *need* expensively obtained QSL cards to know when I've worked a country. For example, ten minutes ago I called ZS5LB in a pile-up and he came back. I was 549, while he was 589 on 10 c.w. A little earlier I worked JA7OWB on 29.6 MHz f.m. and I was 57 from my International Harvester Scout mobile set-up. After a few weeks of operating QRP, with a total time of about 15 hours, I've worked 26 countries on 10, 15, and 20 meters with my Triton and CB conversion rig. Now, I may or may not compete for the DXCC QRPp award. I'm in no hurry and won't be sending any air mail IRC QSL's. I'll send cards via the bureau, but no more than that!

"Two things are important to my DX efforts: (1) instant break-in c.w. and a good receiver with sharp filter; and (2) antennas. I generally use switchable Vee beams with 600 ft. long legs fed with triangular home-made tapered feedline 700 ohms–400 ohms, then couple into a ferrite balun (homebrew) and a run of coax to the transmitter. The current arrangement permits switching to different paired combinations of wires for different DX bearings, with lobes aimed at 25° N, 165° S, 205° S, and 345° N, which pretty well covers it all. I also have 3 and 5 element wire collinear beams *(see my articles in 73* for June, July, and September 1979)."

de . . . WA2PLR, Kevin Larkin, Rt. 1, Box 13, Rodman, NY 13682: "Just a note from another QRP'r out in W2 land. I've been running QRP here for about a year-and-half. Built an HW-8 during the cold winter's nights, and have been real pleased with it. Haven't got a real great antenna setup, just a trap dipole and a 40–10 meter vertical, but have had good results with it so far. Afraid I can't offer any comparisons between the two—seems they both are sufficient sometimes, and other times I have to go out and check to see if they are still up! I guess the only thing I could add as advice to another QRP operator is to echo what has been said many times before—LISTEN. Then listen some more. If there is anything that the QRP op learns quickly, it is how to listen, and how to slip his call in when it'll do the most good.

"Lastly, I offer a toast to the forgotten party to all this. Here's to the ham on the other end! My hat's off to the operator, be he DX or stateside, who strains and concentrates to copy my QRP signal so that I can add another state in my quest for WAS-QRP, or count another country in the long haul towards DXCC QRPp. QRP operation is not especially conducive to ragchews, but occasionally it can be done. So, thanks to all those operators on the other end, for without you to copy my signal, there'd be no log entry, no miles spanned, no friend made!" *(Well said, Kevin!—ed.)*

de . . . WDØFQK, Bill Hensel, 785 Marlund St., Lakewood, CO 80215: "I became a ham back in 1976 and my first rig was a homebrew single-tube job that I blew up before my ticket came in the mail. Money was tight so it took me some time to convince my XYL to let me get the little MFJ-40T which I had only one crystal for. Murphy showed up one day and the power supply voltage got reversed on the little rig and it got smoked. This all occurred on the eastern shore of Maryland while I was a Novice. We moved out to Denver where I bought a DX-20 for $30 and finally started working stateside QSO's running under 15 watts. One night I stumbled onto the CO/WYO code net which I QRM'd because I was crystal controlled. The NCS called me via landline and offered to lend me a v.f.o. so that I could remove myself from the net frequency, an offer which I jumped at! It was a Hallicrafters HT-18 exciter which had 3–5 watts output on 80–10 meters.

"I began working the net as often as I could while at the same time running as many QRP QSO's as I could. I soon found that DX was fairly easy to snatch up with the HT-18 and I worked all states with it. This 5 watt rig seemed too powerful, so I bought an HW-8 which I love to death. As of this time I have logged 1049 QSO's with it! I made your modification to the 15 meter receiver input coil and now DX is there whenever the band is open. The HW-8 is now the only h.f. rig I have. I wonder if any other QRP operator can brag about being a liason station to higher-level NTS nets? I take traffic to the 12th Re-

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gion Net every Sunday night on 80 meters and even have an alternate NCS slot on the Colo. Code Net. I have relayed traffic between Denver and Baltimore a number of times. So it just goes to show that the little HW-8 can be a good public service rig if the operator desires to use it for traffic work. Hope we can run into each other some day on the air!"

Yep, wish I could work a lot more of the guys, too. Just don't get much time for operating these days, but maybe when the *QRP Handbook* is completed, I'll set up a "Work W0RSP Month" and get on the air to chat with the gang. We're out of space this month, but will keep the reports coming in the future.

Club News

The final renovation of the QRP Amateur Radio Club International has been completed with the members' vote (better than 2:1 margin) to abolish the old so-called "power pledge" from the club's by-laws. This pledge required that a prospective member promise to never run more than 100 watts input as a condition of membership. As K8IF notes, "The pledge was a sticking point for many prospective members who refused to join because of it . . . and others refused to renew their memberships." My perspective is that the pledge ignored the reality that an operator who prefers QRP may find it necessary to run high power for public service activities—he was penalized for performing the public service by being refused membership in the club. The QRP ARC I ascribes to the internationally accepted definition of QRP by the 5 watt output (10 w. p.e.p.) standard which is used in regard to the club's contests and awards. A new awards manager has been elected and operators should note this address if intending to apply for any of the club's awards: William Harding, K4AHK, 10923 Carters Oak Way, Burke, VA 22015. Membership fee for the QRP ARC I is $4.00 per year to Tom Davis (K8IF), 11729 Merriman Rd., Livonia, MI 48150. A quarterly newsletter including construction articles, operating hints, member news, and awards news is included in the membership fee.

West Coast QRPers should be alerted to the continued existence of the Pacific Amateur Radio Guild (PARG) with about 100 members. PARG is a QRP organization located on the western seaboard and it sponsors the following Nets: 40—0900, Monday through Sunday, 7070 ±5 kHz; 80—1930, Monday and Wednesday, 3645 ±5 kHz; 20—1000, Friday (after 40 meter Net), 14070 ±5 kHz. NCS varies daily. Membership (open to West Coasters) is $5.00/yr, and includes *Random Radiation* publication every two months. Emphasis is upon active participation among members on the air. Pres. is W7FFT, Gen. Mgr. W6YCT. I have no official address for membership queries, and I hate to do it, but I'll mention that Mike Zane, K6URI, P.O. Box 455, Lodi, CA 95241 provided the above information.

Houston area QRP operators will be pleased to learn that a rather active nucleus of QRPers in the area have formed the Houston Area QRP Club over a year ago, and it is thriving. We'll try to provide details next month, but for the moment, if you live close to Houston, you won't have to wait. Call Leo Delaney, KC5EV, at 713-443-1371, or write to him at P.O. Box 383, Spring, TX 77373, and provide name, call, mailing address, phone; no dues required at present. At last count (May 1981) club membership totaled 16 QRP operators.

Upcoming QRP Events

Some of the QRP operating events readers will want to be reminded of: 4/18/82—R.S.G.B. Low Power Contest; 5/16/82—R.S.G.B. RR C.W. Contest (QRP Section); 5/29-30/82—*CQ* WPX C.W. DX Contest (QRP Section); 4/17-18/82—QRP ARC I Spring QRP Contest; 6/82—A.R.R.L. Field Day. Details can be found in *CQ's* "Contest Calendar" a month or two in advance of the event, or in the QRP ARCI Newsletter, the MI QRP C newsletter, and *SPRAT* of the G-QRP-C. Until next month, 73 and FB QRPing!

Ade, W0RSP

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In My Opinion:

Talk or Babble: Communications And The Radio Amateur

BY LOUIS JANICEK*

Stop! Put your mike down. Push that key away. Power everything down. Danger is near but we don't see it. We don't even know it's there. What's that you say? The commies are coming? No, the danger is not a commie behind every bush. The danger lies in that we have taken the meaning of communication lightly. Let's sit back and take a good hard look at ourselves, our hobby, and our understanding of communication.

Webster says communication is "to be connected . . . to exchange ideas . . . sharing. . ." The *ARRL Handbook* says of our hobby, " . . . it's a way of discovering new friends while experimenting with different and exciting new ways to advance the art of our hobby. Ham radio is a global fraternity of people with common and yet widely varying interests, able to exchange ideas and learn more about each other."

We've lost sight of that. We are losing our ability to communicate. We've come to emphasize the *means* of communication over the *content* of communication. We are not alone in this, however. Society itself is now consumed with faster, shinier, flashier, but not necessarily better.

Look at Ma Bell. Remember those nice, cozy phone booths in ice cream parlors and drug stores? Or those great protective (not to mention dry) phone booths on street corners and highways? Well, they are going the way of the dinosaur. One by one, they are being replaced by open-air wall units. And with them goes the possibility of the intimate, thoughtful, personal conversations that used to be possible in a booth. The entire pattern of communication in America is changing as a result, but that's progress. It's just another triumph of technological means over human needs—a victory of means over meaning. Sure phones work better now. They are faster, come in "designer" colors and styles, are more electromechanically reliable (with pushbuttons to boot), but the communication they allow is more superficial and less personal. They are fine for finding out what to pick up at the corner store after work, but not at all satisfactory for patching up a fight between mates—not at all conducive to real, personal, meaningful talk.

Look at CB radio (shudder if you must, but read on). Except for emergency highway monitoring and CD work, the CB "happening" is but the mindless explosive chatter of gadget-oriented consumers playing with a new toy—a shiny toy, and yet only silly inanities to mumble about from "Rubber Ducky" and "Felix the Cat" to "Where's Smokey?" Silhouetted in the glow of their fancy digital readouts, they sit babbling to one another on the level of your average one-year-old. They've got top-notch sophisticated equipment, but nothing worthwhile to say. All the emphasis is placed on the means of communication—faster, sharper, newer—but no thought is given to increasing the value, content, or meaning of what is being communicated.

Hold on now. What's all this got to do with me? I'm no lid. I'm an educated amateur radio operator. Well, don't look now, but it's happening to us, too!

Amateur radio is a broad service. It attracts people of widely differing interests. There are those with a keen experimental and technological bent, those exploring the fringes of the latest advanced communication techniques. In our hearts we all have that incurable love of tinkering, of fostering the growth and advancement of newer, better ways to communicate electronically. However, there is much more to amateur radio than even that.

The majority of amateurs like to just plain talk. Ragchewing with other amateurs is great, but from my listening post, our conversations are more and more empty, meaningless, and joyless QSO's. (I won't even go into the problem of the increasing number of rude amateurs who are jamming, QRMing, and otherwise polluting our bands with their lack of courtesy and proper operating savvy.) Most times an operator will just mumble along about his latest new-fangled platinum-plated widget. That's fine to a point, but amateur radio is supposed to bring people together in understanding and sharing. We are instead becoming like the amateur photographer who spends so much time at the camera shop buying the latest high-spec lenses and film, that he has no time to actually go out and take some pictures. We'll spend hundreds, sometimes many thousands, of dollars in new rigs, antennas, and digital whatevers, and then with mike in hand, we'll run through 100 3-minute QSO's about the local temperature and humidity without really having touched or having been touched by the other amateur.

The ultimate ironic technological folly is that of the amateur who has at his fingertips the means to talk halfway around the globe and then can only mumble vague comments about signal strength and local weather conditions once his signal gets there.

We are fast letting ourselves be done-in by our own technology. I'm not against progress and growth. I'm not a back-to-the-woods hermit. However, technology is swiftly outpacing man's ability to understand himself. We are being swallowed up by our own creation. So much is possible through our hobby, but so many possibilities for mutual enrichment and sharing are being overshadowed and smothered by our emphasis on the trivial. We talk more and more about less and less using better and better equipment.

Okay, you've been warned! Power up those rigs again and get out those propagation charts. Think to yourself "content, meaning, and sharing." Let's get back to that good old serious ragchewing. Let's get down to talking to each other about ourselves—our interests, our ideas, and our other hobbies. Let's really talk—talk about fishing, hunting, politics, astronomy, beer drinking, and even beer stein collecting. Let's share a real personal part of ourselves on the air. We'd better, lest we gradually but surely become nothing but simple-minded drones babbling across the continents.

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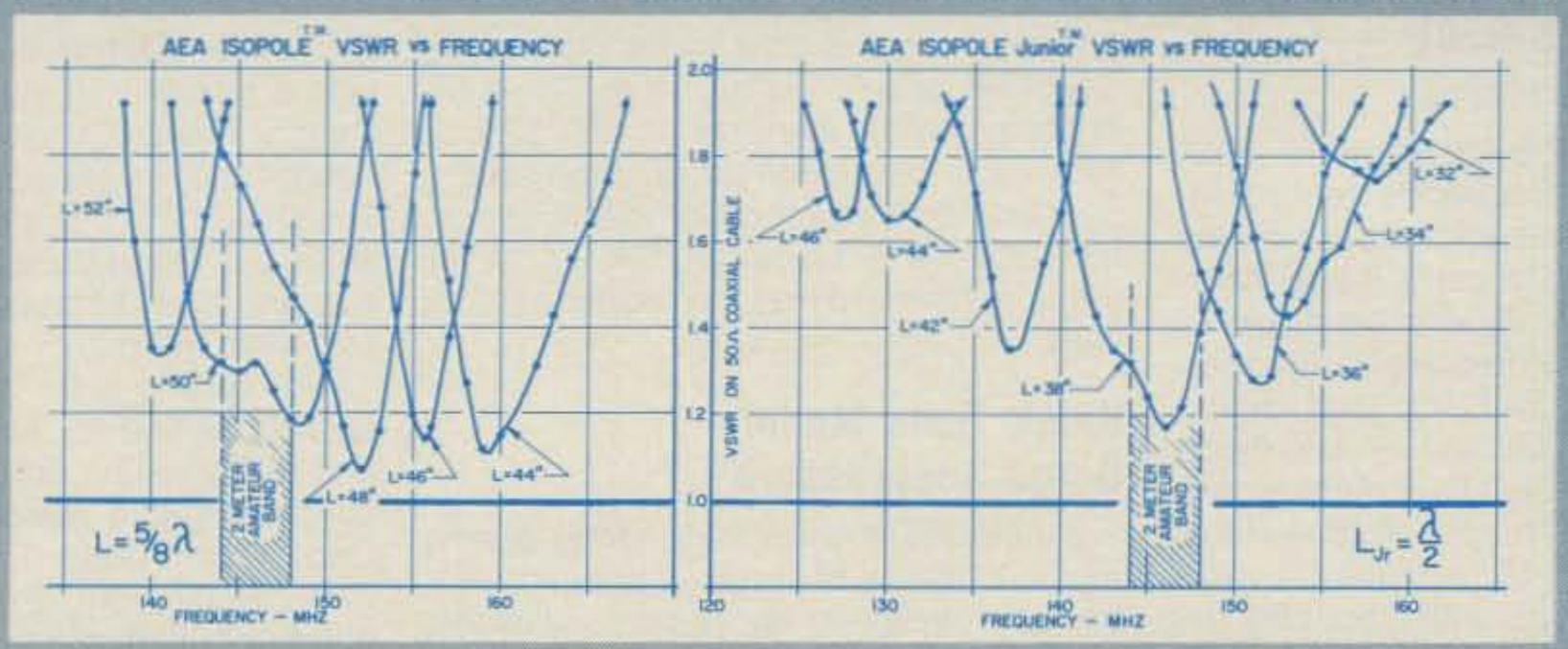

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The Quad-I sells for $49.95, and the Quad-II for $59.95. All units are prewired and ready to use. For more information, contact Kalglo Electronics Co., Inc., Dept. Quad, 6584 Ruch Rd., East Allen Twp., Bethlehem, PA 18017, or circle number 102 on the reader service card.

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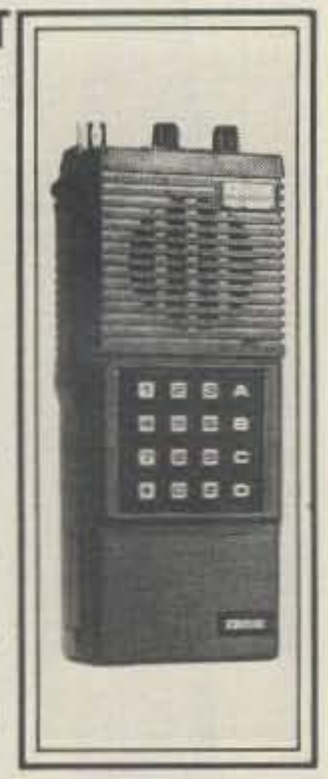
ICOM IC-3A/IC-3AT 220 MHz Handheld



A "second cousin" to the ICOM IC-2A, the IC-3AT is for coverage of the 220 MHz band. The unit is essentially identical in appearance, size, and operational features to the IC-2A series. All accessories, including battery packs, chargers, microphone, etc., are completely compatible for the IC-2AT and the IC-3A series.

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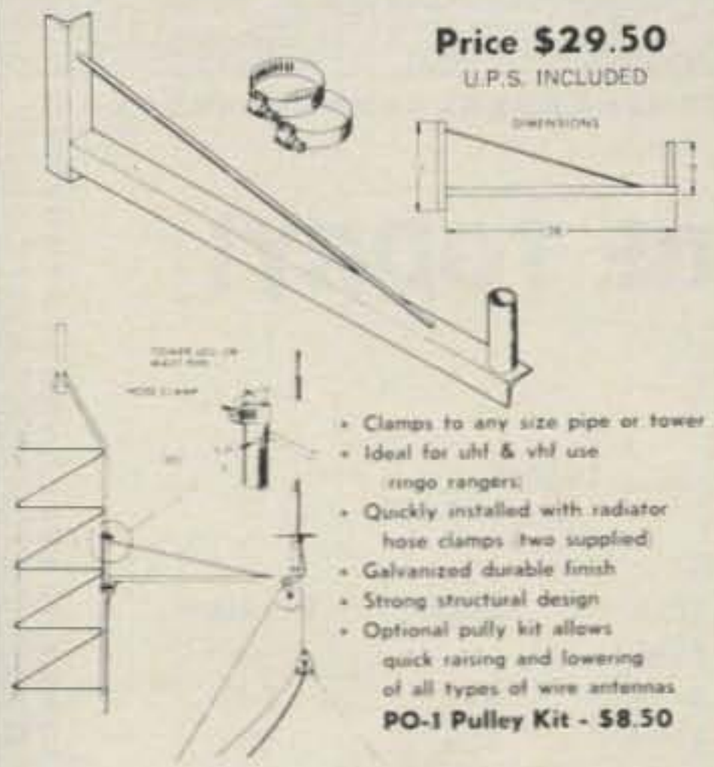

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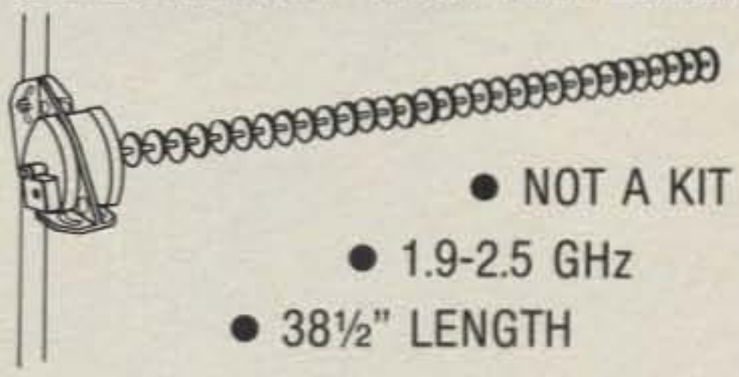

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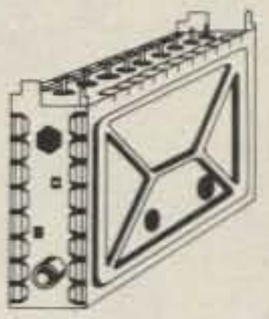

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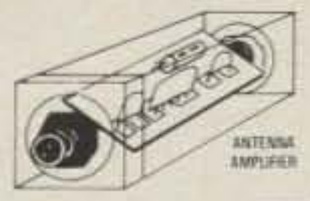

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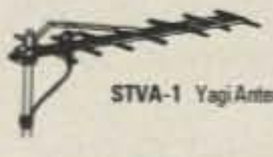

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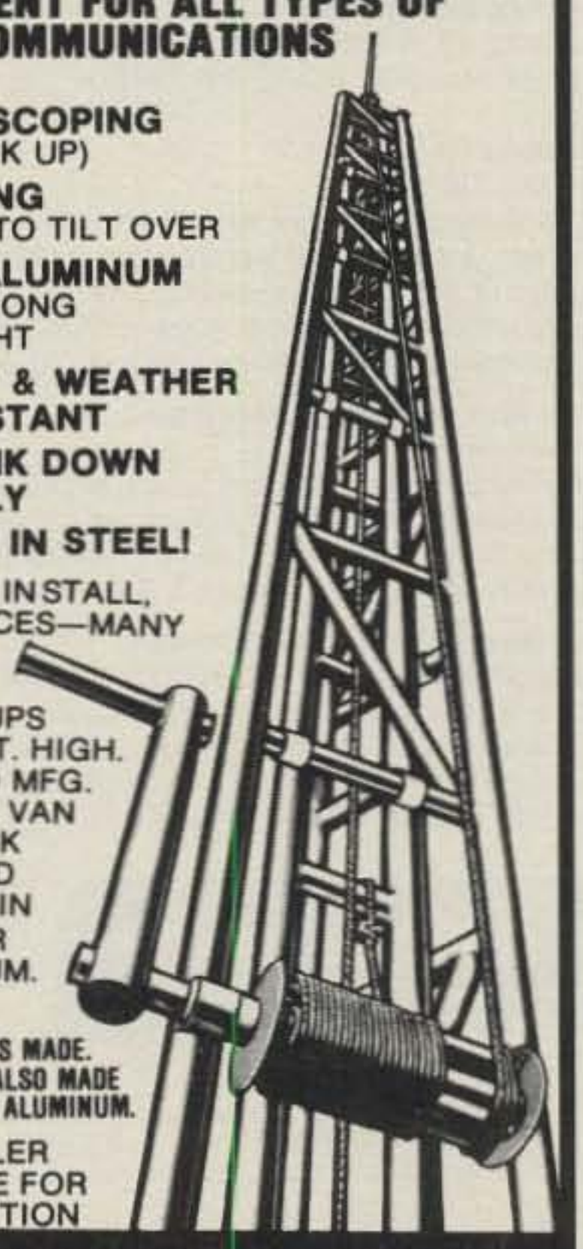

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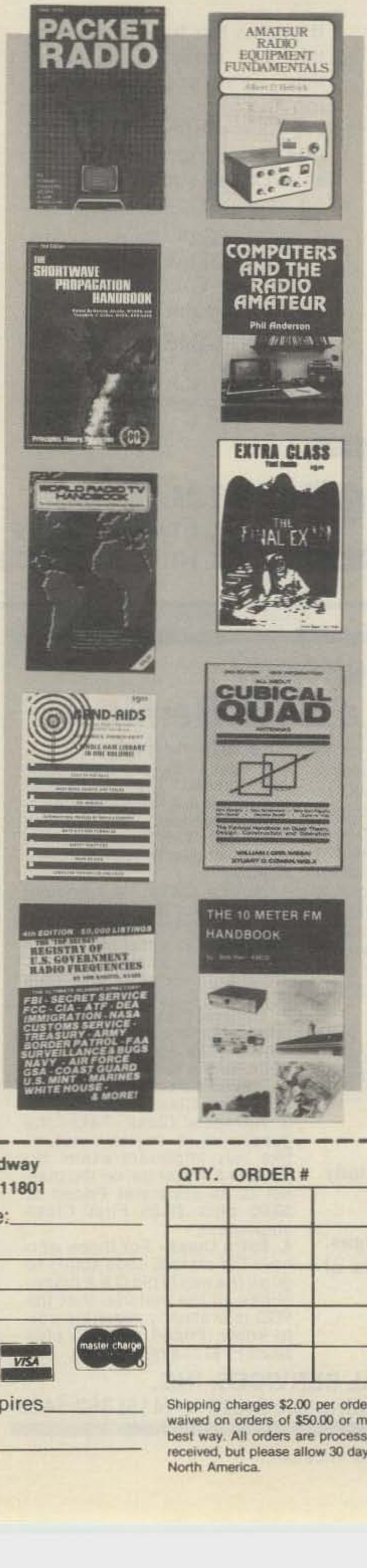

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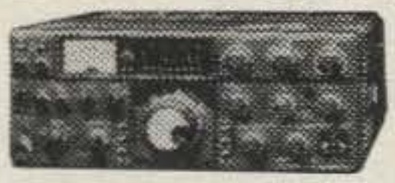
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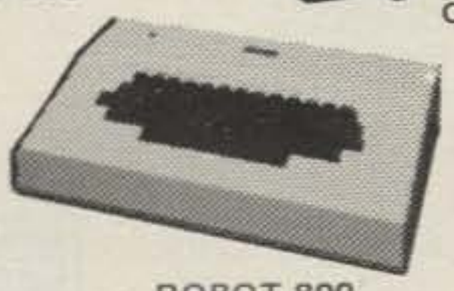
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CIRCLE 9 ON READER SERVICE CARD

MOR-GAIN

1/2-size (75M only 66')

Multi-Band (5, 4, 3 bands)
80/75M thru 10M

Broadbanded - no traps used

Prices start at $82.50

MOR-GAIN

THE MOR-GAIN HD DIPOLES are the most advanced, highest performance multi-band HF dipole antennas available. Patented design provides length one-half of conventional dipoles. 50 ohm feed on all bands, no tuner or balun required. Can be installed as inverted VEE. Thousands in use worldwide. 22 models available including two models engineered for optimum performance for the novice bands. The Mor-Gain HD dipoles N/T series are the only commercial antennas specifically designed to meet the operational requirements of the novice license. Our 1-year warranty is backed by nearly 20 years of HD dipole production experience.

For detailed 10-page brochure, write or phone directly to **MOR-GAIN**, P.O. Box 329C, Leavenworth, Ks. 66048, Tel. (913) 682-3142.

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CIRCLE 8 ON READER SERVICE CARD

BULLET ELECTRONICS

P.O. BOX 401244C GARLAND, TX 75040 214/278-3553

7 Watt Audio Amp Kit $6.95

SMALL, SINGLE HYBRID IC AND COMPONENTS FIT ON A 2" x 3" PC BOARD (INCLUDED). RUNS ON 12VDC. GREAT FOR ANY PROJECT THAT NEEDS AN INEXPENSIVE AMP. LESS THAN 3% THD @ 5 WATTS. COMPATIBLE WITH SE-01 SOUND KIT.

Doomsday Alarm Kit $9.95

If you have trouble sleeping and you would like the rest of the neighborhood to share your misery then this little kit will be for you! There is no way to accurately describe the unearthly howls, screams and tones that come out of this kit. Four separate tone oscillators are mixed, cancelled and stepped at a varying rate. 10 Watts of crazy sounds. A great fun kit or a practical burglar alarm. Complete with PC board and all necessary components less speaker. For 6-12 VDC. ORDER DA-02

New! 3TZ Time Zone Clock Kit

Microprocessor/ROM clock kit keeps local time (12 hour format), and 2 world time zones (24 hour format). Large .6" ORANGE readouts 10 min. ID timer for HAMS. Comes complete with attractive plastic case and wallplug XFMR.

- 6 Digit (hrs., min., sec.)
- 3 Time Zones (Selectable)
- Feathertouch front panel switches
- Seconds Reset/Hold feature
- Quartz XTAL Timebase
- Battery backup
- Quality solder masked and plated PC boards

$54.40

Overvoltage Protection Kit $6.95

Protect your expensive equipment from overvoltage conditions. Every computer should have one! **Works with any fused DC power source** from 10 to 20 volts up to 25 amps.

Sound Effects Kit $18.50

The **SE-01 Sound Effects Kits has** all you need to build a programmable sound effects machine except a battery and speaker. Only the SE-01 provides you with additional circuitry that includes a **Pulse Generator, Mux Oscillator and Comparator** to make more complex sounds a snap. **Includes TI76477**, (w/specs) assembly instructions and programming examples. You can easily create **Gunshots, Explosions, Storm Trains, Wind & Surf** and much more.

Complete Kit $18.50
With quality PC Board (Less battery & spkr.)
76477 Chip is included
Extra chips $3.15 ea.

ELECTRONIC MUSIC MAKER

THIS UNIQUE KIT CONTAINS A *MICROPROCESSOR CHIP* WITH *ROM*. IT HAS BEEN PROGRAMMED TO PLAY THE FIRST *6 TO 10 NOTES* OF THE TUNES LISTED BELOW. *CONSTRUCTION IS SIMPLE*, WORKS WITH ANY 8 OR 16 OHM SPKR.*(NOT INCLUDED)*. THE KIT WILL OPERATE ON *12VDC* OR *12VAC* WITH *OPTIONAL TRANSFORMER*, (CONVERTS TO 117VAC). *ALL COMPONENTS & BOARD*

Complete Kit $16.95 Transformer $1.35

Tunes: Toreador * William Tell * Hallelujah Chorus * Star Spangled Banner * Yankee Doodle * America, America * Deutschland Lied * Wedding March * Beethoven's 5th and 9th * Hell's Bells * La Vien En Rose * Star Wars Theme * Clementine * Augustine * Jingle Bells * God Save The Queen * Colonel Bogey * Marseillaise * O Sole Mio * Santa Lucia * The End * Blue Danube * Brahms Lullaby * Westminster Chime * Simple Chime * Descending Octave Chime

Regulator Card Kit $14.95

This is the Regulator Card from our famous **20A Power Supply Kit.** Although we ran out of the transformers and heatsinks, many customers have been able to locate their own. The regulator card performs the actual voltage regulation and has adjustable fold back current limiting. Output voltage **is stable to 200MV from 0 to 20 Amps and adjustable from 11 to 14 Volts.** Designed to drive 2 high current NPN transistors (2N3771 2N5301 or equiv.) The unit assembles quickly. Included are all the on board components including a driver transistor and over-temp shutdown sensor. Designed to screw down to a standard 3" diameter computer grade filter cap. The quality plated PC card is 3-1/2" x 4 3/4".

WITH INSTRUCTIONS

REGULATOR CARD KIT	**$14.95**
HIGH CURRENT PARTS	
(2 - 2N3772 & 25A Bridge)	$5.00
51,000 MFD @ 40V Computer Grade	$3.50

Requires Transformer with 16 - 19 VAC Out @ The Current You Expect To Draw.

THE SUPER MUSIC MAKER KIT REVISION 2 – $24.95

Now you can play hundreds of songs using the Bullet **Super Music Maker**. The unit **features a single factory programmed microprocessor IC** that comes with 20 pre-programmed short tunes. By adding the additional PROMS (2708's) the system can be expanded to play up to **1000 notes per PROM**. The kit comes with **all electronic components (less the PROM)**, and a drilled, plated and screened PC Board which measures 4" x 4½". The **7 watt amplifier** section is on the same PC board and drives an 8 ohm speaker (not included). Since the unit works on **12 VDC** or **12 VAC**, vehicle or portable operation is possible. **What do you get for $24.95? Everything but a speaker, transformer, case, switches,** and **PROM**. Additional 2708 PROM's album containing popular tunes are available for **$9.95** each. Lists of available PROM albums are available on request.

DIP Switches One 8 pos., One 5 pos. 2.00/Set
(Can be **directly soldered** to PC Bd. to access tunes)
Rotary Switches Two 5 position 2.50/Set
(For **remote wiring** to PC Bd. to access tunes)
Attractive Tan Plastic Case 8.50
Wallplug Transformer 3.00
(For operation on 117VAC house voltage)

INVENTORY CLEARANCE

CA3080 TRANS COND AMP	.88
TLO-82 DUAL BI-FET AMP	.88
CD4566 CMOS - 50/60 CNTR	.88
MC3301 QUAD OP AMP (HSE #)	.44
FPT500 PHOTO TRANSISTOR	.44
TIP 100 NPN DARL. 2A IC	.88
TEMP CONTROLLED HOTPLATE 5" x 10" TEMPERED GLASS 110°F to 160°F	1.88
3850 (F8) MICRO P CHIP	2.88
10103 SENSITIVE GATE SCR	3/.88

Start the new year right...the saving way!

DUAL PHOTO RESISTOR 3/8" DIA.	3/.44
2" 8 OHM SPKR. .25 W	2/1.88
AY 3-8910 SOUND EFFECTS	11.88
60 PAGE MANUAL FOR ABOVE	2.88
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SUPER SPECIAL DEAL!
STANDARD C-60 CASSETTE, NEW, IN PLASTIC CASES, TOP QUALITY ORIG. USED IN DIGITAL APP., FREQ. RESPONSE 300HZ - 10KHZ
1.30 ea. 3/3.50

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- ALL FOREIGN ORDERS ADD 25% FOR SHIPPING (CANADA 15%) NO FOREIGN COD'S
- CALL (214) 278-3553 TO PLACE CREDIT CARD OR COD ORDER

a monthly feature by
A. EDWARD HOPPER, W2GT

Awards

NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of The Month for May as told by Larry is:

Larry C. Taylor, AC2J
All Counties #268, 2-6-80

"My interest in amateur radio came from a desire to have an additional frequency on which I could fly my radio-controlled airplanes. Frank Roney, W2YWK, agreed to help me with c.w. during lunch hour at work. It took me about a month, working 15 to 20 minutes a day, to get my Novice license, and in June of 1977 I was on the air as WB2PMO.

"The allure of radio-controlled airplanes was decreasing as my interest in amateur radio grew, so I sold my R.C. gear to buy more radio equipment.

"Still working with W2YWK at lunch, I finally felt I was ready for the next exam, and in October I received my Advanced license. When the FCC came out with new call signs, I wanted one in the worst way, and it was back to c.w. lessons with Frank. These lessons now included several other guys working at different levels, and before long I was ready to try to upgrade my license for the last time.

"In January 1978 I took the test and passed the c.w. with flying colors, but I missed the exam by one question. I tried again in March and received my Extra license; AC2J was now on the air, less than one year after I started in amateur radio. *Thanks W2YWK!*

"I am not a native New Yorker. Most of my life was spent in Kansas and Missouri except for four years in the Navy.

"While in the Navy I married my Kansas sweetheart, Loyce, and after the Navy we moved back to Kansas, where I attended Kansas University and received a degree in Electrical Engineering. Since graduation I have worked for IBM at the Federal Systems Center in Owego, New York. I went to night school and finally obtained my Masters Degree in Advanced Technology from the University of New York.

"Three additions to our family were born here in New York: Shawn, Jevan, and Chantel. Chantel was born just three weeks before I got my last county, and I was afraid with all the commotion of a new baby, I might miss that last one; by the way, she is the one you hear in the background when I am on the air.

Larry, AC2J, with well-equipped radio room and family.

AC2J where he ran Grant County, New Mexico from this dry wash.

"I found the County Hunter's Net in January 1978 while working on WAS and chasing DX, and I was hooked right from the start. Having talked with so many County Hunters and made many friends, I was very excited when I found I could attend a Mini Convention in Albany, New York. It was a big thrill to be able to meet some of these friends in person, and it was there that the idea of a New York mobile week was conceived. All of the New York Counties were run in a week on 20 and 80 meters; but after all the planning and work we did, I was called out of town on business and didn't get to run a county.

"The last two counties I needed were in Nebraska, and on January 26, 1980, W0BM made a special trip to give them out—a special thanks to Bill.

"Now that I have worked all the counties, I would like to give out as many counties as possible as a mobile, which fits in with my family's desire to see the U.S.A. As a start toward this goal, we were on vacation in the southwest and looking for a small town just inside a county line in New Mexico, when we decided we were hopelessly lost. We stopped and asked a rancher where the county line was (I have no idea what he thought, as we were driving out in the middle of nowhere looking for a county line), but he told us we were in the county. In trying to get back to the main road, we ended up in a dry wash; I just gave up, stopped, and ran the county there. A recent trip to Maine netted 32 new counties in 1500 miles and we didn't get lost once!

"I hope to get to as many CH Conventions as possible to give my personal thanks to the many people who helped me with All Counties #268. Until then, and to the ones I don't meet, thanks a lot. See you on the Net."

P.O. Box 73, Rochelle Park, NJ 07662

Special Honor Roll
All Counties

#357 R.L. Robertson, N5QQ 1-11-82.
#358 Garry V. Hammond, VE3GCO 1-14-82.
#359 Henry Zimmerman, KB7W 1-18-82.
#360 David F. Crowley, Jr., W1III 1-22-82.
#361 Bruce A. Roberts, KC9DD 1-27-82.
#362 Chuck Boyd, N0BHO 2-4-82.

Awards Issued

Bob Robertson, N5QQ (ex-WA5TPO), requested All Counties endorsed Mixed.

Garry Hammond, VE3GCO, added to his fine collection USA-CA-2500 endorsed All S.S.B., All 20, All Mobiles; and USA-CA-3000 and All Counties endorsed Mixed. As VE3-7554, Garry received USA-CA-500 in May 1964, and as VE3GCO, USA-CA-500 in August 1969.

Henry Zimmerman, KB7W, added USA-CA-2500, 3000, and All Counties endorsed Mixed to his nice collection.

Dave Crowley, W1III, got all his paperwork finished to acquire USA-CA-3000 and All Counties endorsed Mixed.

Bruce Roberts, KC9DD (ex-WB9AAJ), claimed All Counties endorsed All S.S.B.

Chuck Boyd, N0BHO, waited until he

Say You Saw It In CQ

USA-CA Honor Roll

3000				1000	
WB9QNX	383	KB7W	446	VE3KZE	694
K6SLP	384	NØBHO	447	NØBHO	695
VE3GCO	385				
KB7W	386	2000		500	
N4CCJ	387	NØBHO	501	K1LPS	1682
W1III	388			WA2CNF	1683
NØBHO	389			LZ2KTS	1684
		1500		KC8CC	1685
2500		W3EFY	563	4Z4DX	1686
VE3GCO	445	NØBHO	564	NØBHO	1687

had them all and applied for USA-CA-500 through All Counties endorsed All S.S.B.

Dave Bishop, WB9QNX, had me send him USA-CA-3000 endorsed Mixed.

Larry Moore, K6SLP, picked up USA-CA-3000 endorsed All S.S.B.

Don Conrad, N4CCJ, made USA-CA-3000 endorsed Mixed.

Al Polaneczky, W3EFY, obtained USA-CA-1500 endorsed Mixed.

Tom Rosebush, VE3KZE, qualified for USA-CA-1000 endorsed Mixed.

USA-CA-500 certificates, endorsed Mixed, went to:

Larry Filby, K1LPS.

The Troyan City Radio Club, LZ2KTS (#4 to Bulgaria).

Dave Wilcox, KC8CC.

Dov Gavish, 4Z4DX (#2 to Israel).

Bob Shaw, WA2CNF, gained USA-CA-500 endorsed All C.W.

Oh, before I get into trouble, I must mention that Tom Ross, K9GTQ, who already has All Counties #250 endorsed All S.S.B., did a lot of paperwork and time on the Net to upgrade endorsement of his USA-CA-3000 to make it endorsed All S.S.B., All Mobiles, and All 14.

Awards

Ham Brothers Award: Work the two ham brothers, OE5CUL and OE5CWL, on any band, any mode. Send your QSLs, log data, 3 IRCs to: OE5CWL, Jurgen A. Weigl, Robert Koch Street 68, A 4600 Wels, Austria.

Worked Laen P: The Boras Radioamatorer of Sweden sponsor this Award, which is available to amateurs and s.w.l.'s. Contacts with Laen P after January 1, 1980 are valid for the award. All bands and modes are permitted, but *not* via repeaters. Scandinavian countries must have worked and received QSLs from 25 different stations in Laen P. Other European countries must have 15, and all other countries must have 5. Send certified log data list to: Boras Radioamatorer, c/o Lars Lind, SM6NT, Ekesund, S-520 11 Vegby, Sweden. The cost is: 10 Swedish crown, or $2 U.S., or 10 IRCs. For SM only: Postgiro 87 78 17 - 7.

North Bay Railway Centennial Award: Sponsored by the North Bay Amateur Radio Club to commemorate steel coming to the area—actually the three railroads coming to North Bay (the Canadian Nation Railway, the Canadian Pacific Railway, and the Ontario Northland Railway). The last railway runs to the foot of James Bay at Moosonee. James Bay is tidal water, being part of the Arctic Ocean system.

1882 1982

NORTH BAY RAILWAY CENTENNIAL AWARD

ONTARIO, CANADA

North Bay Amateur Radio Club and city of North Bay are pleased to present this award to amateur radio station ..... operator .....

for three contacts with North Bay stations in 1982.

North Bay Railway Centennial Award.

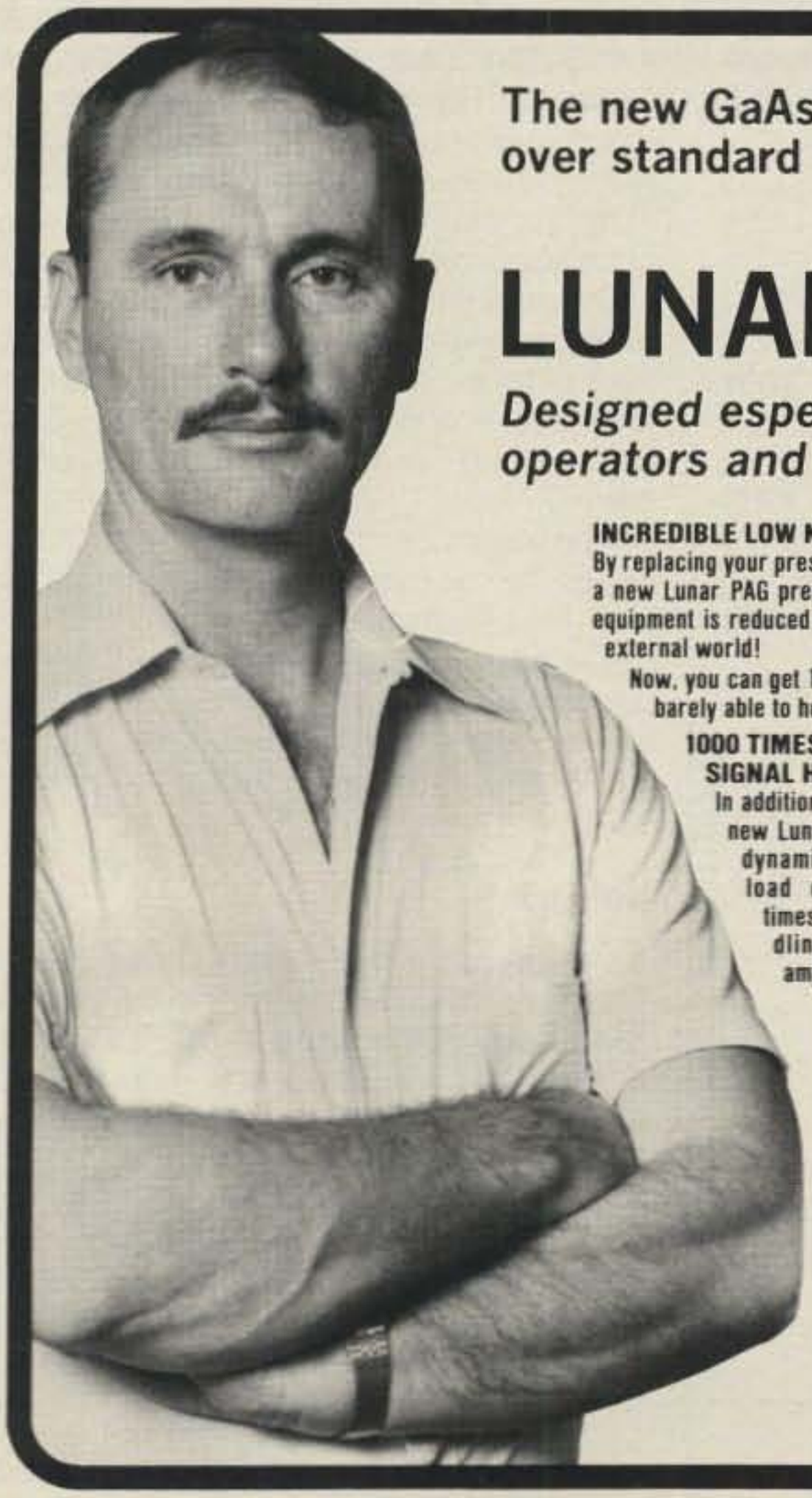
Rules:

1. A Centennial Certificate will be awarded to any licensed amateur who makes confirmed two-way contacts with three North Bay, Ontario amateur radio stations during the year 1982.

2. Any amateur band may be used, any mode may be used, cross-mode included, excluding repeaters.

3. Contact may be made with a given station only once.

4. Send two QSL cards to Box 624, North Bay, Ontario, P1B 8J5, Canada. One card is for the mayor of North Bay



The new GaAs FET preamps improve dynamic range up to 10 times over standard FET's, and up to 1000 times over bi-polar amps!

Introducing the new

LUNAR PAG PREAMP SERIES

Designed especially by Louis N. Anciaux WB6NMT, for repeater operators and those working low noise, weak signal.

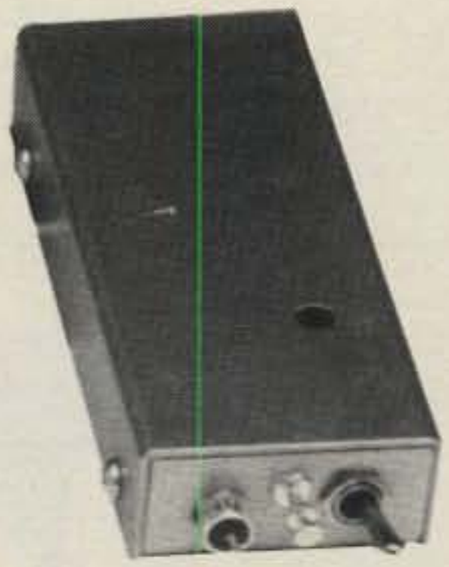
INCREDIBLE LOW NF .5 dB TYPICAL
By replacing your present front end preamp unit with a new Lunar PAG preamp, noise generated by your equipment is reduced so your main limitation is the external world!

Now, you can get 100% copy of signals you were barely able to hear before!

1000 TIMES IMPROVEMENT IN SIGNAL HANDLING LEVELS
In addition to reducing noise figure, the new Lunar PAG preamps provide high dynamic range, thus a high overload capability . . . up to 1000 times improvement in signal handling levels over bi-polar preamps. No longer can your signal get crunched by external signals.

PROVEN PERFORMANCE!
At the August '80 Central States VHF conference at Colorado Springs, our new PAG 144 and 220 preamps won the NF contest with the amazing low NF figure of .2 dB. No other preamps came close!

INSTALL A NEW PAG PREAMP IN YOUR REPEATER
to increase your sensitivity and dynamic range and to reduce intermodulation problems.



TYPICAL PERFORMANCE PA COMPARISONS

	dB G	dB NF	dBm 1 dB Comparison
PA144	10 dB	1.3 dB	+1 dBm
PAD144	22 dB	1.3 dB	+1 dBm
PAG144	26 dB	0.2 dB	+12 dBm
PA220	9 dB	1.9 dB	+1 dBm
PAD220	19 dB	1.9 dB	+1 dBm
PAG220	24 dB	0.2 dB	+11 dBm
PA432-2	16 dB	1.5 dB	-20 dBm
PAE432-5	18 dB	0.95 dB	-20 dBm
PAG432	18 dB	0.50 dB	+11 dBm

Other special and commercial preamps also available.

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Telex: 181747
Louis N. Anciaux, WB6NMT

CIRCLE 94 ON READER SERVICE CARD

and will be displayed in the City Hall. The other is for the operator. *(Note:* Only one duplicate card is required, or a total of four.)

5. Communication with the club station during Centennial Week, August 9–16, 1982 will count as two contacts. The station will operate under the call XO3NBC. (Thanks to Bill, VE3GWM for this data.)

CW Operators Of The British Commonwealth (C.W.B.C.): Here is a certificate for all c.w. amateurs in the British Commonwealth (actually others may participate). Bands 160 through 10 meters may be used, and contacts on or after 1 January 1980 are okay.

Class I (the basic award) is earned for 2-way c.w. contacts as follows:

No. of QSOs	Call Areas
1	ZL North Island
1	ZL South Island
3	VK1, 2, 3, 4, 5, and 7
1	VS5, 6 or 9M 2, 6, 8
2	VU2
3	ZS1–6 (not Antarctica)
2	VP 1, 2
3	VE1, VO1, 2
6	G

Total 22 QSOs —

Classes II and III 2-way c.w. contact requirements are shown on the certificate. 43 additional QSOs are required.

Send log data, certified by one other amateur operator, for each class to the Awards Sponsor, VE1ACK, 35 Clearview Avenue, Fredericton, N.B., Canada E3A 1J9. (Do not send QSLs.) There is no fee for the award, but IRCs for mailing the award would be appreciated.

Cork Radio Club DX Award: The Award is available to licensed amateurs and s.w.l.'s. Only contacts with members of the Cork Radio Club or EI stations in County Cork are valid. Any band and any mode may be used. QSL cards are not required. Send log data showing call sign, name, date, time, band, and mode used to : W. O'Reilly, EI8AU, Mount Oval, Rochestown, Co. Cork, Ireland. The fee

Luis, HI8LC, the only holder of a USA-CA-500 Award in the Dominican Republic.

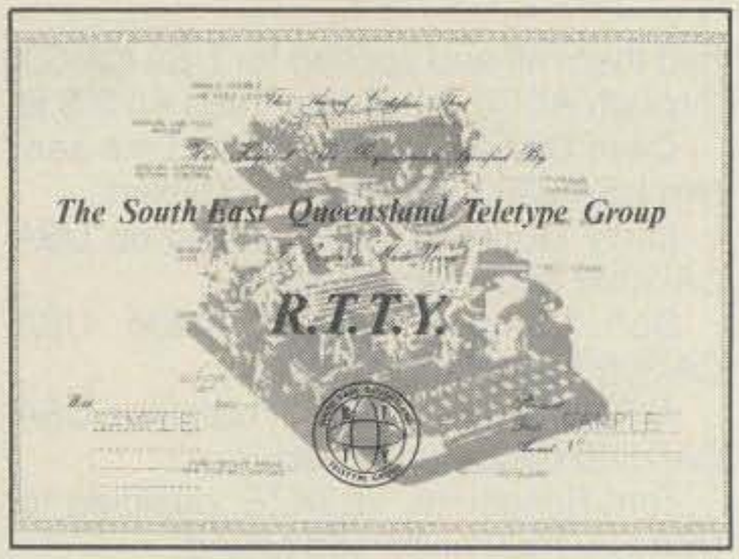
Douglas S. Hall, WA4UNS, All Counties #276 (see his story in CQ, March 1982 column).

for the Award is 10 IRCs or $3.00 for DX, first class airmail, 8 IRCs for Europe. Every effort will be made to meet claims where sufficient funds are not enclosed, and a fund is being set up for this purpose.

Contacts required are: DX—2 contacts; Europe—3 contacts; EI/G—4 contacts.

Valid stations include: EI 1CI, 1CN, 1CS, 1DA, 2Q, 2AD, 2AJ, 2BA, 2CK, 2CV, 2DQ, 2EG, 3BB, 3BF, 3BK, 3BV, 3BW, 3CA, 3CB, 3CE, 3CV, 3DP, 3EC, 3EF, 3EG, 4BZ, 4DQ, 4EC, 4CE, 4CR, 4DF, 5I, 5AG, 5AL, 5AR, 5CD, 6AE, 6AK, 6AG, 6AX, 6BA, 6BT, 6CB, 6CK, 6DB, 6DC, 7V, 7AE, 7AL, 7CG, 7CT, 7CW, 7AV, 7DJ, 7EL, 8Q, 8AB, 8AP, 8AU, 8DK, 8DJ, 8CR, 8CS, 8EI, 8DS, 9E, 9X, 9W, 9AB, 9BY, 9CH, 9CZ, 9DG, ØDH, and 2S.

The South East Queensland Teletype Group Award: This Award is available to all transmitting and listening amateurs who gain award points in the following manner: Australian amateurs must score 5 points, overseas amateurs 3 points.



The South East Queensland Teletype Group Award.

A. To qualify, a station must, where possible, copy the official station of the South East Queensland Teletype Group, VK4TTY, during a news broadcast, and in the case of a transmitting amateur, participate in the call back (2 award points). A portion of the printout of the news broadcast together with the date, time, frequency, and broadcast number are to accompany the request for the award.

B. Additionally, a transmitting amateur must work three member stations of the South East Queensland Teletype Group on RTTY (1 point each). Log extracts and/or printouts are to be included with the award application, and each member station may be counted only once towards the award.

C. Listening amateurs should, in lieu of (B), forward log extracts and/or printouts of three contacts involving different member stations of the South East Queensland Teletype Group (1 point each).

Applicants for the Award should forward the above information, together with one Australian dollar or 5 IRCs to cover postage and printing costs, to: The Secretary, S.E.Q.T.G., P.O. Box 184, Fortitude Valley, Queensland 4006, Australia. (Thanks to Dave, VK4AFA, for this data.)

Notes

As I wrote this, a telephone call came from Bill, WA3ZMY, who insists that he has a copy of the General license of Molly, WD4IUY. I was happy to hear that, as my letter to the QTH given to me by the FCC bounced back. Therefore, QSOs/QSLs with/from WD4IUY are okay for USA-CA. Bill also mentioned that the call KL7NV has been issued, but we do not think he is a County Hunter, Hi! You will remember that KL7NV was used illegally awhile back. Good Hunting!

73, Ed, W2GT

VIDEO STABILIZER KIT

Eliminate picture rolling & jittering caused by copyguarded tapes with our own video stabilizer. Now you can be assured of a true stable picture for quality taping at a price you can afford.

All kits include pre-drilled & etched PC Brd., all components, connectors, hardware, predrilled case, instructional booklet, & 30 day parts warranty.

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Complete high quality home satellite systems available now from $3895. All systems include heavy duty polar mount. Send $1.00 for information packet & pricing refundable on any order.

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2300 MHZ CONVERTER KIT.....**$35.00**
Includes PC board, parts & instruction manual.

SELECTIVE PREAMP.....**$44.50**
For use with above converter. This preamp can also be used with other manufacturer's boards for improved performance.

VARIABLE POWER SUPPLY.....**$24.95**
Includes all components, case, overlays, and built in antenna switch.

DELUXE 2300 MHZ CONVERTER KIT.....**$99.95**
Recommended for experienced kit builders. Dual stage selective preamp, mixer, i.f. amplifier and no drift crystal-controlled oscillator.

12V STATIONARY POWER SUPPLY.....**$24.95**
For use with Deluxe Converter

KD-44 DISH KIT.....25 db Gain.....**$54.95**

KD-22 DISH KIT.....19 db Gain.....**$24.00**

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CIRCLE 39 ON READER SERVICE CARD

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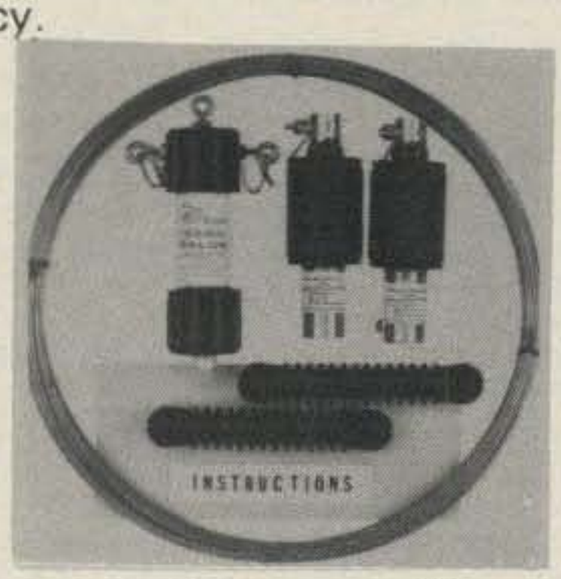
Round after round of transmission, durable all-weather UNADILLA/REYCO baluns, traps and kits will take you the distance. Unadilla/Reyco will suppress feedline radiation and maximize antenna efficiency better than any competitive HAM line.

The Big Signal W2AU Balun gives you the right connection between any antenna and transmitter. The W2AU Balun can withstand 600 lbs. of pull, has a built-in lightning arrestor and can handle full legal power. For more than 20 years, it's been the choice of HAMS, Armed Forces and commercial communication around the world.

The Old Reliable W2VS Reyco Trap will always give you the perfect dipole. Professionals demand Reyco Traps because they're weatherized and can withstand 500 lbs. of pull. Developed by veteran HAM W2VS, Reyco Traps are paired by precision frequency.

The W2AU/W2VS 5-band Antenna Kit includes everything for low SWR on 40 and 80 meters, and resonants on 10, 15 and 20. The quality crafted components in this kit are time tested by HAMS around the world.



Other Unadilla/Reyco products include low pass filters, quad parts, insulators and endsulators. Call for our free catalog and the name of your nearest dealer. Hamfest managers: we cooperate. Remember: Unadilla/Reyco will take you the distance.

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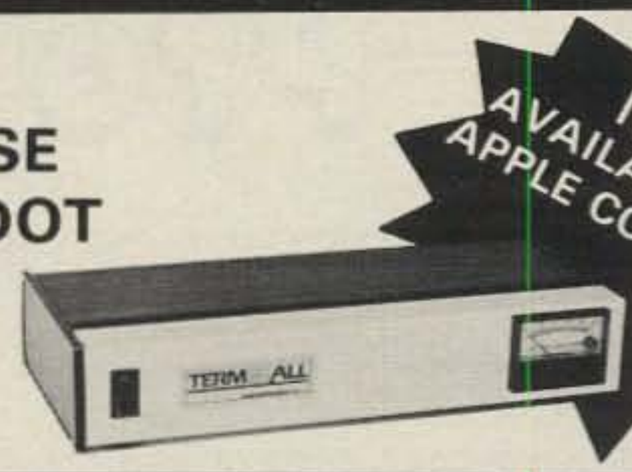

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a monthly feature by
GEORGE JACOBS, W3ASK

Propagation

THE SCIENCE OF PREDICTING RADIO CONDITIONS

During May, as the sun rises higher in the northern sky, optimum frequencies for long-distance propagation become *lower* during the daytime hours, and *higher* during the hours of darkness, in the northern hemisphere.

Generally good-to-excellent h.f. propagation conditions are expected during May. World-wide DX openings should be possible during most of the daylight hours on both *15* and *20* meters, and to southern and tropical areas on *10* meters as well. From sundown to midnight *20* and *40* meters should be optimum for DX, with some *15* meter openings also likely towards southern and western areas. Some fairly good DX should also be possible on the *80* meter band during this period. From midnight to sunrise good DX openings should be possible to many areas of the world on *20, 40,* and *80* meters.

The following summarize conditions expected on each amateur band *10* through *160* meters during May.

10 Meters: A seasonal decrease is expected in DX propagation on this band during May. While fewer DX openings are forecast in a generally east-west direction, some fairly good ones still should be possible towards southern and tropical areas during much of the daylight period. Frequency short-skip openings, between distances of approximately 750 and 1400 miles, are forecast for May.

15 Meters: This should be the best band for DX propagation during the daylight period. Openings to most areas of the world should be possible during the late morning and afternoon hours, with excellent openings forecast towards tropical and southern areas during the evening hours as well. Numerous and widespread short-skip openings, over distances between approximately 600 and 2300 miles, are also forecast from shortly after sunrise, through the hours of daylight, and well into the evening hours.

20 Meters: Expect this band to remain open for DX to one area of the world or another almost around the clock. It should be the optimum band for DX during the early evening and throughout most of the hours of darkness and the sunrise period. Exceptionally high signal levels are expected during many DX openings, particularly during the hours of darkness. Numerous and widespread short-skip openings are forecast for this band over distances ranging between 350 and 2300 miles. During the late afternoon and early evening hours it is very likely that excellent conditions will exist for both long- and short-skip simultaneously. This mix is expected to result in exceptionally high levels of interference.

40 Meters: The combination of higher static levels expected during May and the decreasing hours of darkness may result in a deterioration in DX propagation conditions on the *40* meter band. Good openings, however, should be possible to most areas of the world during the sunset period, throughout the hours of darkness, and at sunrise. Excellent daytime short-skip openings are forecast for distances between 150 and 750 miles, with nighttime openings expected to extend out to the short-skip limit of approximately 2300 miles.

80 Meters: Higher static levels and fewer hours of darkness should result in somewhat poorer DX conditions on this band during May. Some fairly good DX openings should be possible, however, to many areas of the world during the hours of darkness and the sunrise period. While the band will open during much the same time period as *40* meters, signals will be weaker and noisier on *80* meters. Excellent short-skip openings are forecast during the daylight hours for distances ranging between 50 and 250 miles. During the hours of darkness, the short-skip range should extend out to approximately 2300 miles.

160 Meters: There is little chance during May for more than a very occasional DX opening on this band. Those few DX openings that may occur will take place during the hours of darkness and the sunrise period. Short-skip openings beyond a groundwave range of a few dozen miles are also very unlikely during the daylight hours. After sunset, short-skip openings should be possible up to a distance of approximately 1200 miles. Occasional openings beyond this range may be possible on some nights when static levels are lower than usual.

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for May 1982

Propagation Index	Expected Signal Quality (4)	(3)	(2)	(1)
Above Normal: 5, 10, 20, 24, 27	A	A	B	C
High Normal: 4, 6, 11, 19, 21, 23, 25-26, 31	A	B	C	C-D
Low Normal: 1-3, 8-9, 14-15, 18, 22, 28-30	A-B	B-C	C-D	D-E
Below Normal: 7, 12-13, 16	B-C	C-D	D-E	E
Disturbed: 17	C-E	D-E	E	E

Where expected signal quality is: **A—Excellent opening, exceptionally strong, steady signals greater than S9 + 30 dB.**

B—Good opening, moderately strong signals varying between S9 and S9 + 30 dB, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find *propagation index* associated with particular band opening from Propagation Charts appearing on the following pages.

2. With the *propagation index*, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be good-to-fair (B-C) on May 1st through 3rd, good (B) on the 4th, excellent (A) on the 5th, etc.

For updated information, subscribe to bi-weekly MAIL-A-PROP, David D. Meisel, Editor, 54 Westview Crescent, Geneseo, NY 14454.

V.H.F. Ionospheric Openings

While solar activity is on the decline, it may still be high enough during May to permit some *F2*-layer openings on *6* meters during the daylight hours. Some trans-continental openings, and openings between the western states and Hawaii, should be possible, as well as openings into the Caribbean area and to Central and South America. An occasional opening may also be possible from western states to the South Pacific and Asiatic areas. The best time to check for *6* meter openings is from 10 a.m. local time through the late afternoon hours, particularly when conditions are expected to be High Normal or better.

A considerable seasonal increase in sporadic-*E* ionization is expected during May. This should result in frequent *6* meter short-skip openings over a range of 1000 to 1400 miles. During periods of widespread and intense sporadic-*E* ionization, two-hop *6* meter openings may occasionally take place over greater distances. An occasional short-skip opening on *2* meters, for distances ranging between 1000 and 1400 miles, may also be

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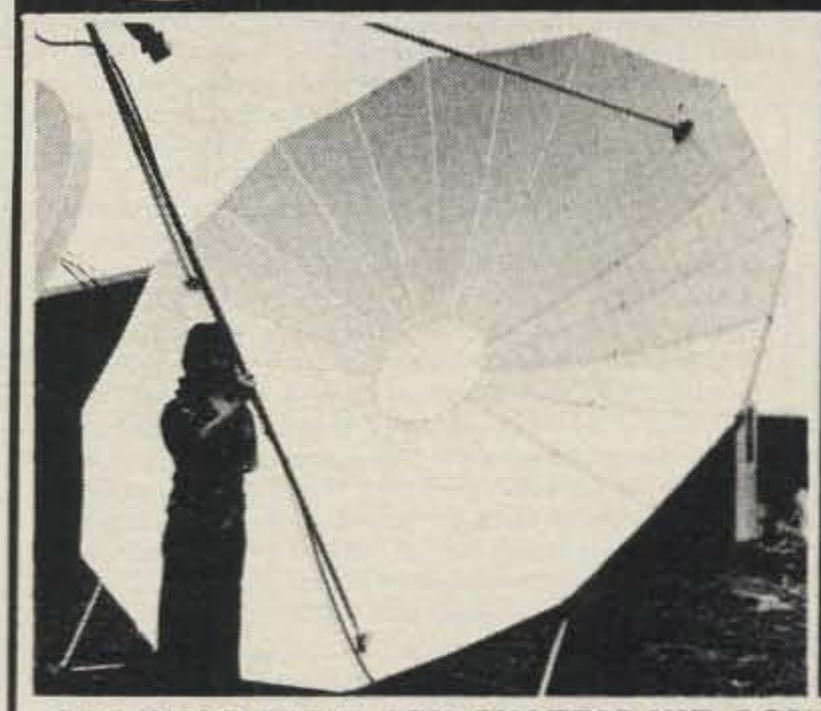

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CIRCLE 52 ON READER SERVICE CARD

possible during very intense sporadic-*E* ionization. Sporadic-*E* ionization can occur at any time, but it is more frequent between 10 a.m. and 2 p.m. and between 6 p.m. and 10 p.m. local daylight time.

An occasional trans-equatorial scatter (TE) opening may be possible on *6* meters between the southern tier states and South America. The best time to check for TE openings is between 9 and 11 p.m. local daylight time. At best, expect very weak signals with a high degree of flutter fading.

Some fairly good meteor-burst ionospheric openings may be possible on both *6* and *2* meters between May 4th and 6th as a result of the *Eta Aquarids.* This is a major meteor shower, and it is expected to peak with a count of approximately 20 meteors an hour. Intermittent openings over distances between approximately 800 and 1200 miles are likely to result from this meteor shower.

A seasonal decline is expected in auroral activity during May, although some may occur. The best time to check for v.h.f. ionospheric openings resulting from auroral activity is on those days on which radio storminess is expected. Check the Last Minute Forecast which appears at the beginning of this column for dates that are expected to be Below Normal or Disturbed. Auroral-type openings generally range from several hundred miles up to a maximum distance of approximately 1300 miles.

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CIRCLE 34 ON READER SERVICE CARD

Sunspot Cycle Progress

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean sunspot number of 110.7 for January 1982. This results in a 12-month running smoothed sunspot number of 140 centered on July 1981. This is a drop of one point in the present cycle from the level of 141 recorded for June 1981. A smoothed sunspot number of 118 is forecast for May 1982.

73, George, W3ASK

HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distances column of a particular Meter band (10 through 160 Meters) as shown in the left hand column of the Chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate Meter band column (10 through 40 Meters) for a particular geographical region of the continental USA as shown in the left hand column of the Charts. An * indicates the best time to listen for 80 meter openings.

2. The *propagation index* is the number that appears in ( ) after the time of each predicted opening. On the Short-Skip Chart, where two numerals are shown within a single set of parenthesis, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of *days* during the month on which the opening is expected to take place, as follows:

(4) Opening should occurr on more than 22 days
(3) " " " between 14 and 22 days
(2) " " " between 7 and 13 days
(1) " " " on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual *dates* on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

3. Times shown in the Charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M. etc. On the Short-Skip Chart appropriate *daylight time* is used at the *path midpoint.* For example, on a circuit between Maine and Florida, the time shown would be EDT; on a circuit between N.Y. and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are HST. To convert to daylight time in other USA time zones, *add* 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone, and 6 hours in the EDT zone. *Add* 10 hours to covert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 15 or 3 P.M. in Los Angeles; 18 or 6 P.M. in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *daylight* time in other areas of the USA *subtract* 7 hours in the PDT zone; 6 hours in the MDT zone, 5 hours in the CDT zone and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 P.M. in N.Y.C.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts c.w. or 300 watts p.e.p. on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts c.w. or 1 kw p.e.p. on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters; a half-wave length above ground on 40 and 20 meters, and a wave-length above ground on 15 and 10 meters. For each 10 db gain above these reference levels, the *propagation index* will increase by one level for each 10dB loss, it will lower by one level.

5. Propagation data contained in the Charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Department of Commerce, Boulder, Colorado, 80302.

CQ Short-Skip Propagation Chart
May & June, 1982
Local Daylight Time at Path Mid-Point
(24-Hour Time System)

Band (Meters)	Distance Between Stations (Miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	08- 10 (0-1) 10- 14 (0-2) 14- 18 (0-1) 18- 22 (0-2) 22- 00 (0-1)	08- 10 (1-2) 10- 14 (2-3) 14- 18 (1-2) 18- 22 (2) 22- 00 (1) 00- 08 (0-1)	08- 10 (2-0) 10- 14 (3-1) 14- 16 (2-1) 16- 19 (2) 19- 22 (2-0) 22- 08 (1-0)
15	Nil	07 -10 (0-2) 10- 14 (0-3) 14- 18 (0-2) 18- 20 (0-3) 20- 00 (0-2) 00- 07 (0-1)	07- 10 (2) 10- 14 (3) 14- 18 (2-4) 18- 20 (3-4) 20- 22 (2-3) 22- 00 (2) 00- 07 (1)	07- 10 (2-1) 10- 14 (3-2) 14- 16 (4-3) 16- 20 (4) 20- 22 (3-2) 22- 00 (2) 00- 07 (1-0)
20	10- 13 (0-1) 13- 19 (0-2) 19- 01 (0-1)	07- 10 (0-2) 10- 13 (1-3) 13- 19 (2-4) 19- 21 (1-3) 21- 01 (1-2) 01- 07 (0-2)	07- 10 (2-3) 10- 13 (3-4) 13- 19 (4) 19- 21 (3-4) 21- 23 (2-4) 23- 01 (2-3) 01- 07 (2)	07- 10 (3) 10- 16 (4-3) 16- 23 (4) 23- 01 (3-4) 01- 03 (2-3) 03- 07 (2)
40	07- 09 (1-2) 09- 12 (2-4) 12- 20 (3-4) 20- 22 (2-3) 22- 01 (1-2) 01- 07 (0-1)	07- 09 (2-4) 09- 10 (4-3) 10- 16 (4-2) 16- 18 (4-3) 18- 22 (4) 22- 01 (2-3) 01- 07 (1-3)	07- 09 (4-3) 09- 10 (3) 10- 16 (2-1) 16- 18 (3-1) 18- 20 (4-2) 20- 22 (4) 22- 07 (3-4)	08- 10 (3-1) 10- 18 (1-0) 18- 20 (2-1) 20- 22 (4-3) 22- 06 (4) 06- 07 (4-3) 07- 08 (3)
80	08- 11 (4) 11- 19 (4-3) 19- 23 (4) 23- 08 (3-4)	08- 11 (4-1) 11- 17 (3-0) 17- 19 (3-1) 19- 21 (4-2) 21- 06 (4) 06- 08 (4-3)	08- 09 (1) 09- 11 (1-0) 11- 17 (0) 17- 19 (1-0) 19- 21 (2-1) 21- 23 (4-3) 23- 06 (4) 06- 08 (3-2)	08- 09 (1-0) 09- 19 (0) 19- 21 (1-0) 21- 23 (3-2) 23- 04 (4-3) 04- 06 (4-2) 06- 08 (2-1)
160	06- 09 (4-1) 09- 10 (2-0) 10- 19 (1-0) 19- 21 (3-1) 21- 23 (4-2) 23- 06 (4-3)	06- 09 (1) 09- 19 (0) 19- 21 (1-0) 21- 23 (2-1) 23- 01 (3-2) 01- 04 (3) 04- 06 (3-2)	08- 09 (1-0) 09- 21 (0) 21- 23 (1) 23- 01 (2-1) 01- 04 (3-2) 04- 06 (2) 06- 08 (1)	08- 21 (0) 21- 01 (1) 01- 04 (2) 04- 06 (2-1) 06- 07 (1) 07- 08 (1-0)

HAWAII
May & June, 1982
Openings Given In Hawaiian Standard Time

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	15-17 (1)	07-12 (1) 12-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-15 (1) 15-18 (2) 18-20 (3) 20-22 (4) 22-00 (3) 00-02 (2) 02-04 (3) 04-07 (2)	19-20 (1) 20-23 (3) 23-02 (1) 20-21 (1)* 21-23 (2)* 23-01 (1)*
Central USA	12-15 (1) 15-17 (2) 17-18 (1)	05-07 (1) 07-12 (2) 12-16 (3) 16-18 (4) 18-20 (3) 20-22 (2) 22-00 (1)	08-12 (1) 12-16 (2) 16-18 (2) 18-22 (4) 22-00 (3) 00-02 (2) 02-06 (3) 06-08 (2)	19-20 (1) 20-21 (2) 21-01 (4) 01-02 (2) 02-04 (1) 20-21 (1)* 21-00 (2)* 00-03 (1)*
Western USA	09-12 (1) 12-17 (2) 17-19 (1)	06-08 (1) 08-10 (2) 10-12 (3) 12-17 (4) 17-19 (3) 19-22 (2) 22-00 (1)	06-08 (4) 08-16 (3) 16-22 (4) 22-02 (3) 02-06 (2)	18-19 (1) 19-20 (2) 20-02 (4) 02-04 (3) 04-05 (2) 05-07 (1) 19-20 (1)* 20-21 (2)* 21-03 (3)* 03-04 (2)* 04-05 (1)*

ALASKA
May & June, 1982
Openings Given in GMT

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	Nil	18-20 (1) 20-22 (2) 22-01 (1) 01-03 (2) 03-05 (1)	20-22 (1) 22-02 (2) 02-06 (3) 06-08 (2) 08-10 (1) 10-14 (2) 14-16 (1)	06-11 (1)
Central USA	Nil	18-21 (1) 21-23 (2) 23-01 (1) 01-04 (2) 04-06 (1)	02-08 (3) 08-14 (2) 14-22 (1) 22-02 (2)	06-09 (1) 09-12 (2) 12-13 (1)
Western USA	00-03 (1)	18-20 (1) 20-23 (2) 23-02 (3) 02-05 (2) 05-07 (1)	02-04 (3) 04-08 (4) 08-14 (3) 14-18 (4) 18-20 (3) 20-02 (2)	06-09 (1) 09-11 (2) 11-13 (3) 13-15 (2) 15-16 (1)

See explanation in "How To Use Short-Skip Charts" in box at the beginning of this column.

* Indicates best time for 80 Meter openings. Openings on 160 Meters are likely to occur during those times when 80 Meter openings are shown with a propagation index of (2), or higher.

Note: The Alaska and Hawaii Propagation Charts are intended for distances *greater* than 2300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.

Announcing

(continued from p. 10)

QSL card and business-size s.a.s.e. to Floyd, WB8TQG, P.O. Box E, Neffs, OH 43940.

● **Orange County ARC To Operate WB2TSA** - The Orange County ARC will operate WB2TSA to celebrate the tenth anniversary of the club and the Diamond Jubilee of Port Jervis, NY, on May 29 from 1400–2200 UTC and May 30 from 1400–2000 UTC. Frequencies will be 10 kHz up from the lower General phone bands. QSL for an s.a.s.e. to OCARC, P.O. Box 434, Cornwall-on-Hudson, NY 12520.

● **Cape Hatteras Lighthouse Special Event** - The Cary, N.C., ARC will operate from 1300Z May 29 to 1600Z May 30 to honor the Cape Hatteras Lighthouse. The call sign will be NB4L. Planned frequencies are 3552, 7052, 14052, 21052, and 28052 kHz c.w.; and 3988, 7288, 21388, and 28588 kHz s.s.b. Send an s.a.s.e. and QSL card with log data to Chuck Davis, NB4L, 304 Atchison St., Garner, NC 27529 for a commemorative certificate.

● **KA6AMT From Bishop, California** - The Bishop ARC will operate KA6AMT from Bishop, Calif., on May 31 in recognition of the annual Bishop Mule Days celebration. Frequencies will be 3.905, 7.240, 14.295, 146.34/94 phone. For a certificate, send a large s.a.s.e. to Bishop ARC, P.O. Box 1024, Bishop, CA 93514.

● **The following hamfests, fleamarkets, etc., are slated for May:**

May 1, **Southern Tier Amateur Radio Clubs Hamfest,** Owego, NY. Contact Craig England, KF2X, RD #1, Box 144, Vestal, NY 13850.

May 1, **3F ARC Swapfest,** Neenah, WI. Contact Mark Michel, W9OP, 339 Naymut St., Menasha, WI 54952.

May 1, **Quannapowitt Radio Assoc. Hamfest,** Lynnfield, MA. Contact Dave Meldrum, KA1MI, 28 Cedar Lane, No. Andover, MA 01845.

May 1–2, **Blue Ridge ARS Greenville Hamfest,** Greenville, SC. Contact Gary D. Whidy, Hamfest Chairman, Rt. 6, Box 268, Travelers Rest, SC 29690.

May 1–2, **Tri-Cities Hamfest,** Gray, TN. Contact Tri-Cities Hamfest, P.O. Box 3682 CRS, Johnson City, TN 37601.

May 1–2, **Yakima ARC (W7AQ) Hamfest,** Yakima, WA. Contact David Pankey, N7BRB, 512 So. 7th St., Yakima, WA 98901.

May 2, **Tri-County Radio Assoc. Hamfest/Flea Market,** Stirling, NJ. Contact Jack Sammarco, 2062 Emerson Ave., Union, NJ 07083.

May 2, **PVRA Flea Market,** East Hartford, CT. Contact Arnie, K1NFE, P.O. Drawer M, Plainville, CT 06062.

May 2, **NEAT Group Flea Market,** Boston, MA. Contact NEAT Group, Inc., P.O. Box 406, Boston, MA 02102.

May 2, **Lynchburg ARC Swapfest,** Lynchburg, VA. Contact P.O. Box 4242, Lynchburg, VA 24501.

May 8, **Ozaukee Radio Club Swapfest,** Cedarburg, WI. Contact Ozaukee Radio Club, P.O. Box 13, Port Washington, WI 53074.

May 8, **Arrowhead Radio Amateur Club Swapfest,** Duluth, MN. Contact Jerry Frederick, NØBNG, 1127 104th Ave. W., Duluth, MN 55808.

May 14–16, **Region Four Air Force Mars Annual Convention,** Lufkin, TX. Contact Ed Langston, 1123 Sayers St., Lufkin, TX 75901.

May 15, **Cadillac, MI, 22nd Swap Shop and Eyeball QSO,** Cadillac, MI. Contact Wexaukee ARA, P.O. Box 163, Cadillac, MI 49601-0163.

May 15, **Durhamfest,** Hillsborough, NC. Contact Durhamfest, Box 777, Hillsborough, NC 27278.

May 15, **Northwest Arkansas ARC Hamfest/Swapmeet,** Rogers, AR. Contact Mary Webb, KA5HEV, P.O. Box 338, Prairie Grove, AR 72753.

May 15–16, **Birmingham Hamfest '82,** Birmingham, AL. Contact Birmingham ARC, Att: Marty Martin, KA4TSG, P.O. Box 603, Birmingham, AL 35201.

May 16, **Tristate ARS Hamfest,** Evansville, IN. Contact Hal Wilson, WB9FNN, RR #8, Box 427B, Evansville, IN 47711.

May 16, **Eastern Connecticut ARA Flea Market and Auction,** Webster, MA. Contact Dick Spahl, K1SYI, Lake Parkway, Webster, MA 01570.

May 16, **Wabash County ARC Hamfest,** Wabash, IN. Contact Dave Spangler, N9ADO, 45 Grant St., Wabash, IN 46992.

May 16, **Indian Foothills ARC Hamfest,** Marshall, MO. Contact Jim Little, KBØDA, 405 E. Rosehill, Marshall, MO 65340.

May 16, **Athens County ARA Hamfest,** Athens, OH. Contact ACARA, P.O. Box 72, Athens, OH 45701.

May 16, **Warminster ARC Hamfest,** Wrightstown, PA. Contact Bill, KA3CHB, P.O. Box 113, Warminster, PA 18974.

May 21–23, **Fresno ARC Hamfest,** Fresno, CA. Contact Fresno ARC, P.O. Box 783, Fresno, CA 93712.

May 22, **Columbia Hamfest,** Columbia, MO. Contact Central Missouri Radio Assoc., Inc., P.O. Box 283, Columbia, MO 65201.

May 22–23, **1982 ARRL Delta Division Convention and Knoxville Hamfest,** Knoxville, TN. Contact Ray Adams, N4BAQ, 5833 Clinton Hwy, Suite 203, Knoxville, TN 37912.

May 23, **Illiana Repeater Systems Danville Area Hamfest,** Georgetown, IL. Contact Wendell Lyons, KA9AYS, 930 E. Polk St., Danville, IL 61832.

May 23, **PRO-Club Hamfest and Picnic,** Pittsburg, KS. Contact Pittsburg Repeater Organization, P.O. Box 1303, Pittsburg, KS 66762.

May 23, **Fremont, Ohio, and Ottawa County ARC's Hamfest,** Fremont, OH. Contact John Dickey, W8CDR, 545 N. Jackson St., Fremont, OH 43420.

May 23, **MAARC Hamfest,** Muncie, IN. Contact Terry Evans, WD9HQH, 522 S. Brotherton, Muncie, IN 47302.

May 23, **Breeze Shooters Hamfest,** near Greater Pittsburgh International Airport, PA. Contact Joe Kyler, K3SJD, 4430 Evergreen Road, Pittsburgh, PA 15214.

May 29, **1982 CARF National Amateur Radio Symposium,** Scarborough, Ontario, Canada. Contact Secretary, Scarborough ARC, Inc., Box 174, Station D, Scarborough, Ontario, Canada M1R 5B5.

May 30, **Maryland FM Assoc. Hamfest,** West Friendship, MD. Contact John Elgin, WA3MNN, 5495 Apt. 2, Harpers Farm Rd., Columbia, MD 21044.

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FOR SALE: Measurements Model 65 Signal Generator, looks good, needs calibration, $125. Measurements model 80 Signal Generator, needs calibration, $175. Howard, WD9CJV, (219) 925-2772.

FOR SALE: Factory rebuilt Ham II Rotor complete with control box, $125; Heathkit SB-200 1 KW Linear with 10 meters, nice, $350; Fuzzbuster-I, $40. KNØQJY, 130 Pike Lake, Duluth, MN 55811, tel. 218-729-6125.

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FOR SALE: Yaesu FTV-250 2 meter transverter, mint condition, manual and cables, $150. Ed Doran, KA9KOB, Rt. 2, Box 7, Barry, IL 62312, tel. 217-335-2687.

WANTED: Hammarlund Receivers, Transmitters, AMPS, Parts, accessories, manuals, etc. Basket cases welcomed. John Bess, WA5VVT, 29 Southmont Drive, Little Rock, Arkansas 72209.

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LOOKING FOR OLD HAMMARLUND receivers working or not for low price (very low if not working). Also looking for USED 6 and 2 meter equip. at low price. Can be old but must work. Also any AM transmitters that cover 160 meters like old DX-100 Heathkit. Gary Mitchell, P.O. Box 1003, Fairfield, CT 06430.

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QRPers: Get details of the G-QRP-Club and free sample magazine from Rev. G.C. Dobbs G3RJV, 17 Aspen Drive, Chelmsley Wood, Birmingham, B37, U.K.

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FOR SALE: Complete station, Heath SB-102, $225. Needs repair. WD2AEC, 914-634-9212. Certified check or cash.

WANTED: Hallicrafters SX-71 receiver and J-38 straight key with shorting bar. W9GXR, 6915 Prairie Drive, Middleton, WI 53562.

SALE: Drake TR-6, 9-NB Noise Blanker, AC-4, MS-4, DC-3, MC-4, $750.00. R4B, $300.00. HA460, $50.00. WA2QLK, 201-780-3439.

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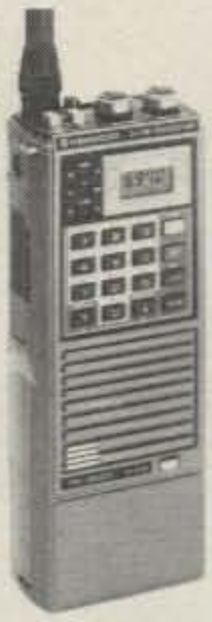

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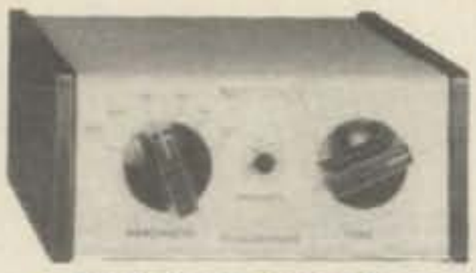

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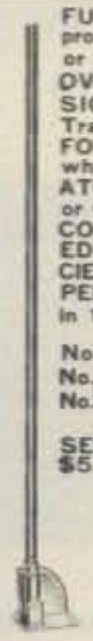

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WANTED: Hallicrafter Receiver SX-28. Picataggi, YV7MB, Ap. do. 4704, Puerto la Cruz, Venezuela.

WANTED: Don Chesser's "Ohio Valley DX Bulletin" copies 1 thru 22. Pse airmail. Jock ZL2GX, 152 Lytton Road, Gisborne, New Zealand.

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SELL: New parts for GLA-1000B. Zener diode 24V 50W, $4.00 ea. Torin TA-450 fan for A or B model, $15.00. 1979 Call Books U.S. and DX, $6.00 ea. pp. Bob Bradley, W9WGD, 1002 Forest Road, La Grange Park, IL 60525.

STARVED ROCK HAMFEST: June 6, Princeton, Illinois, Info by large S.A.S.E. to Starved Rock Radio Club, RFD #1 Box 171, Oglesby, IL 61348.

WANTED: Instruction Manual for Viking Adventurer, Johnson Model 122 VFO or ham band crystals. W9GXR, 6915 Prairie Drive, Middleton, WI 53562.

FOR SALE: HRO-500 and NCL-2000 new parts. SASE Max Fuchs, 11 Plymouth Lane, Swampscott, MA 01907-2996.

ATLAS 350-XL Transceiver with digital dial, auxiliary VFO, power supply, $780. FOB. WA6TKT, 1012 Olmo Ct., San Jose, CA 95129.

ALLIANCE HD-73 rotor and control box $99.99; Bearcat 300 $342.99; Bearcat 210XL $219.99; Bearcat 100 $289.99. Add $3.00 shipping each item within continental USA. Mastercard, VISA or COD. Price quote available for Bearcat and Regency on request. Dealers send letterhead for wholesale price list. Scanner World, USA., 10 New Scotland Ave., Albany, NY 12208 (518) 436-9606.

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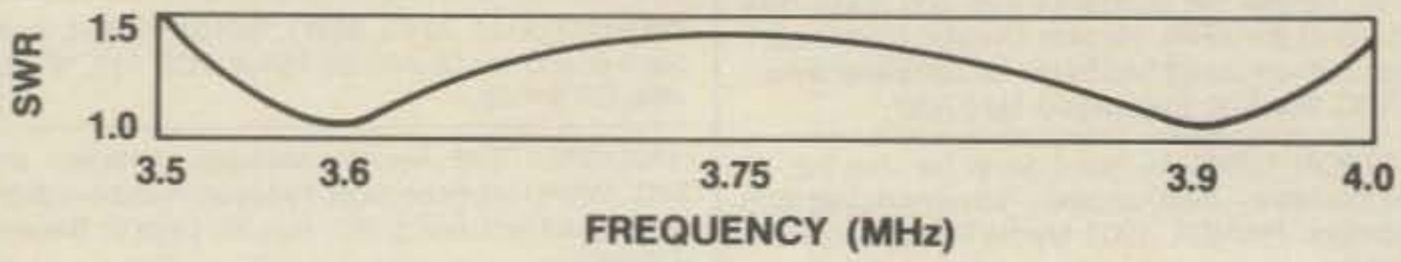

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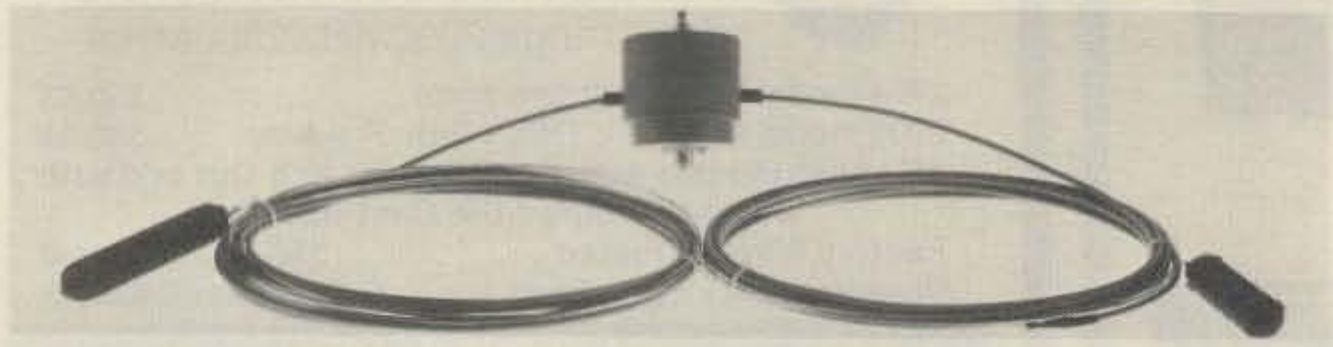

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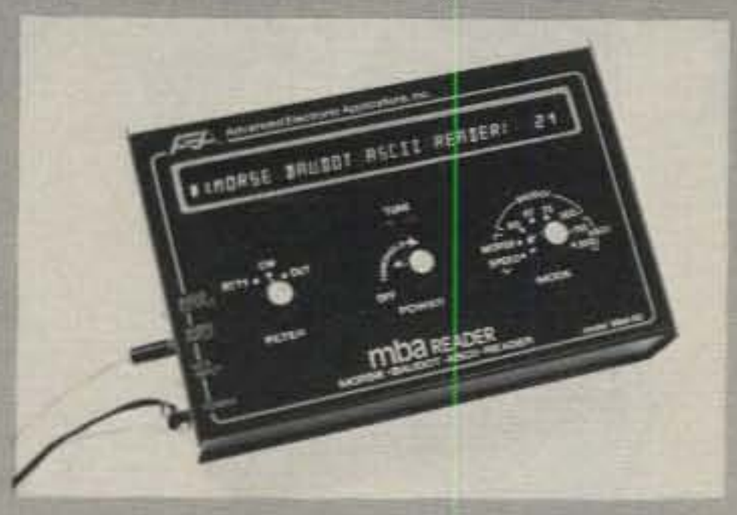

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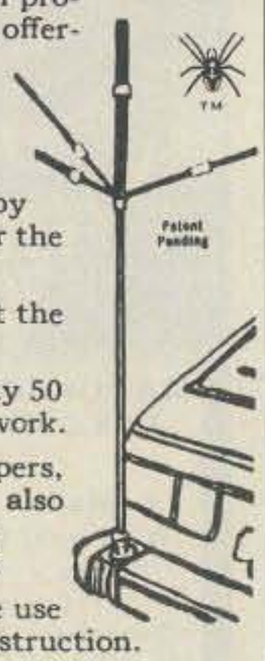

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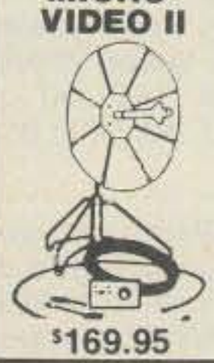

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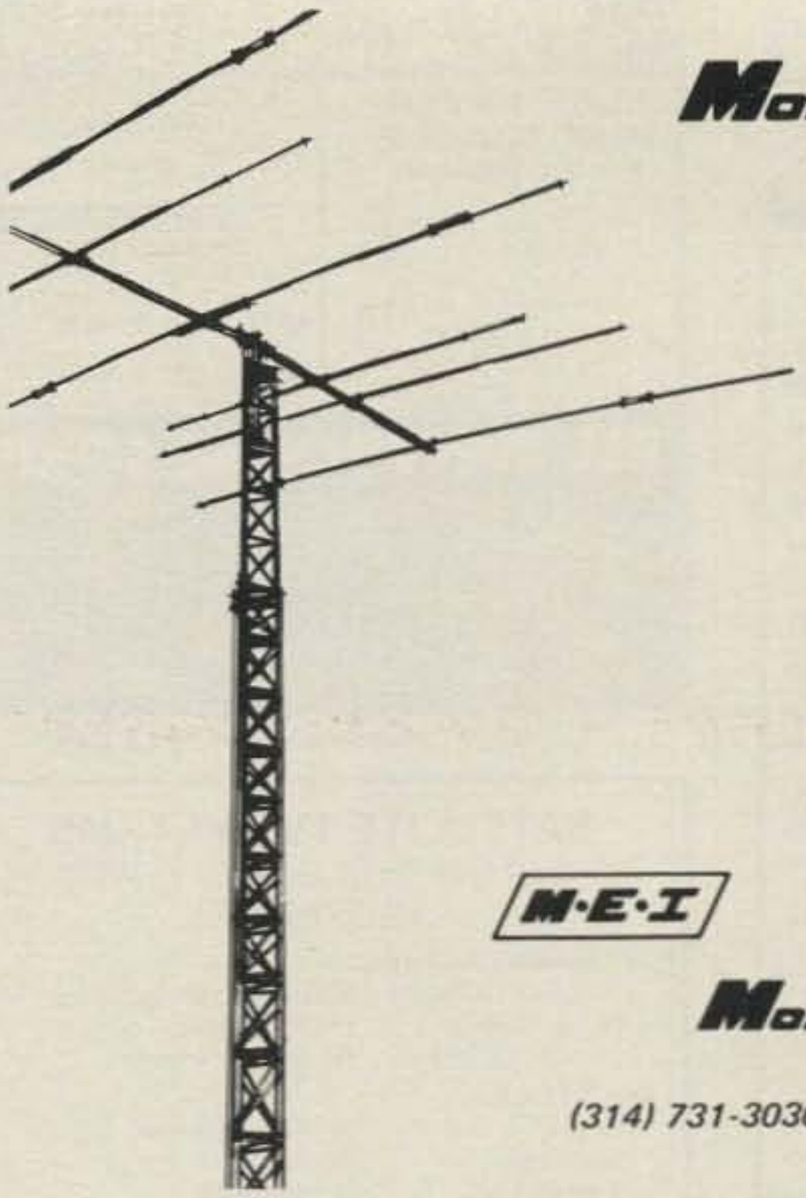

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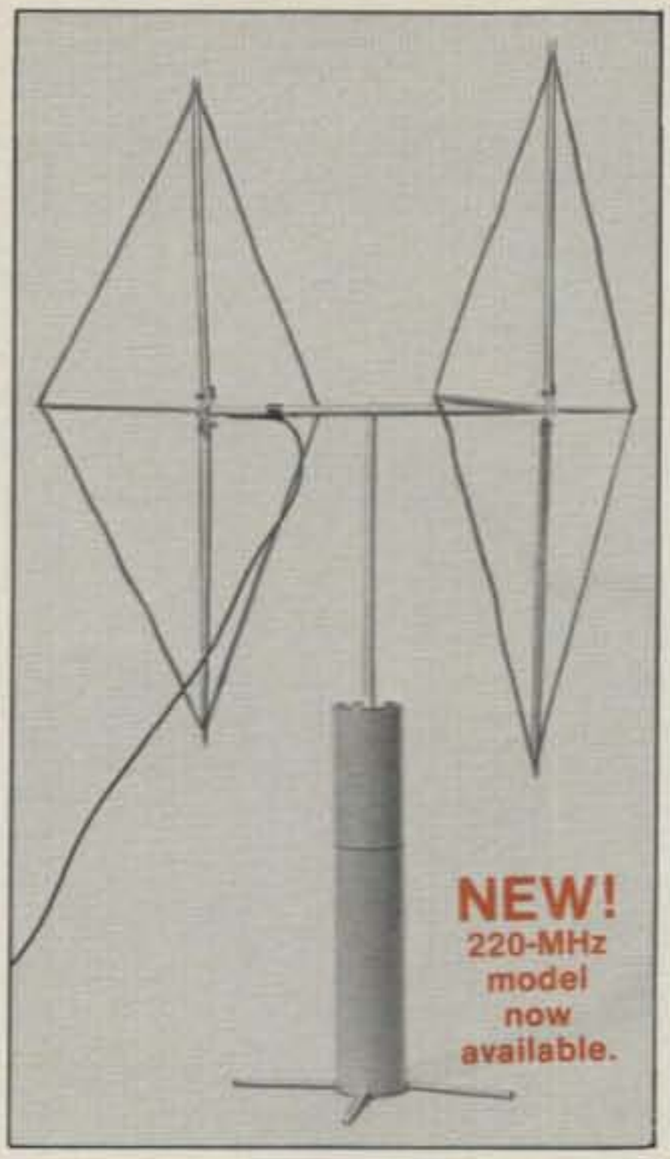

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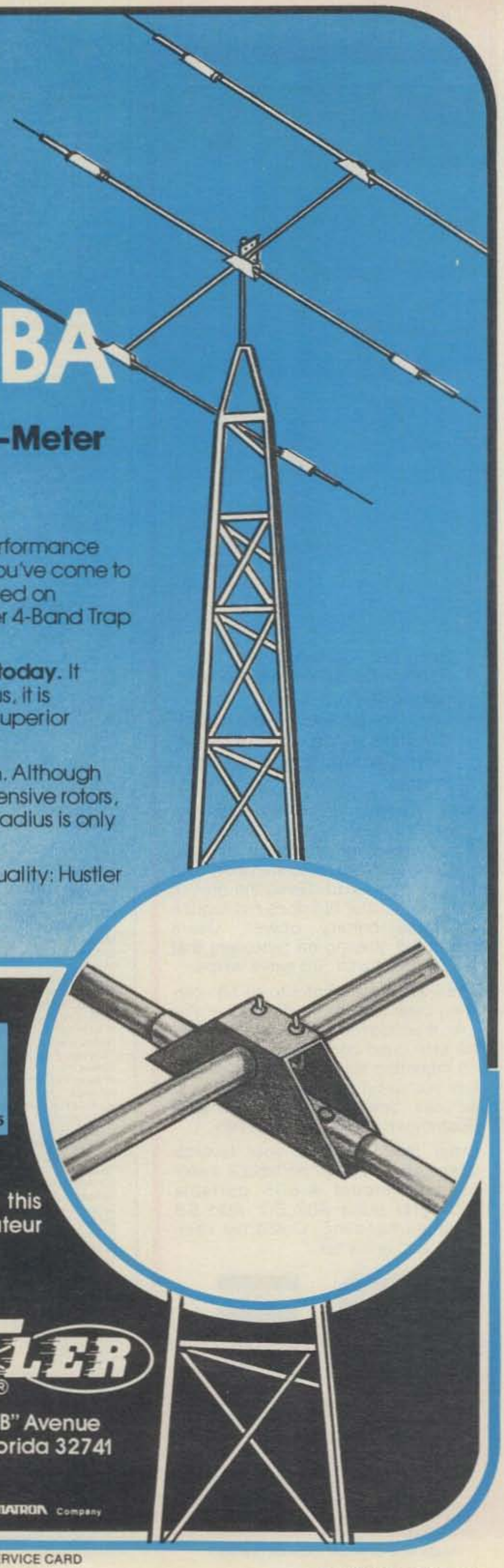

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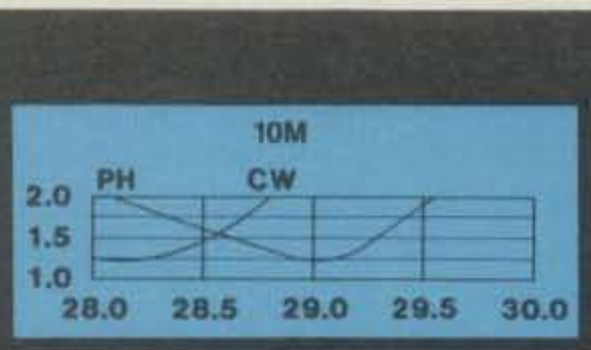

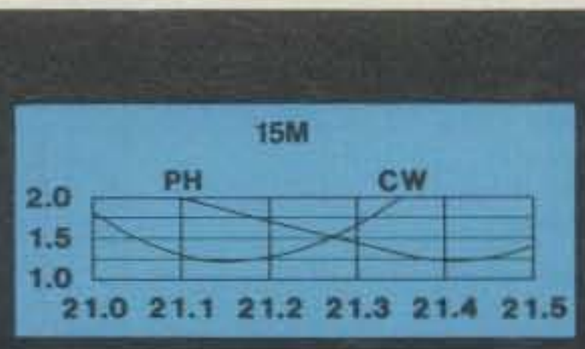

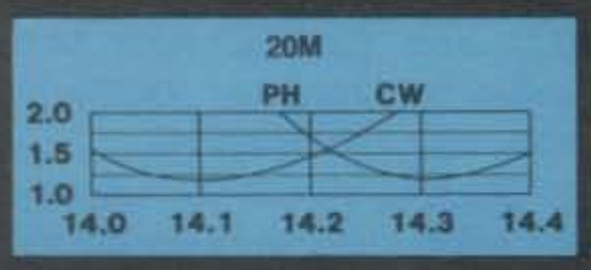

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Specifications:

• Gain	8dB
• F/B Ratio	28dB - (20M)
• Power Rating	1KW at Antenna
• Boom Length	14'
• Longest Element	24'9"
• Turning Radius	14'2-1/2"
• Wind Surface	5.7 Sq. Feet
• Wind Survival	100 MPH
• Weight	40 lbs.

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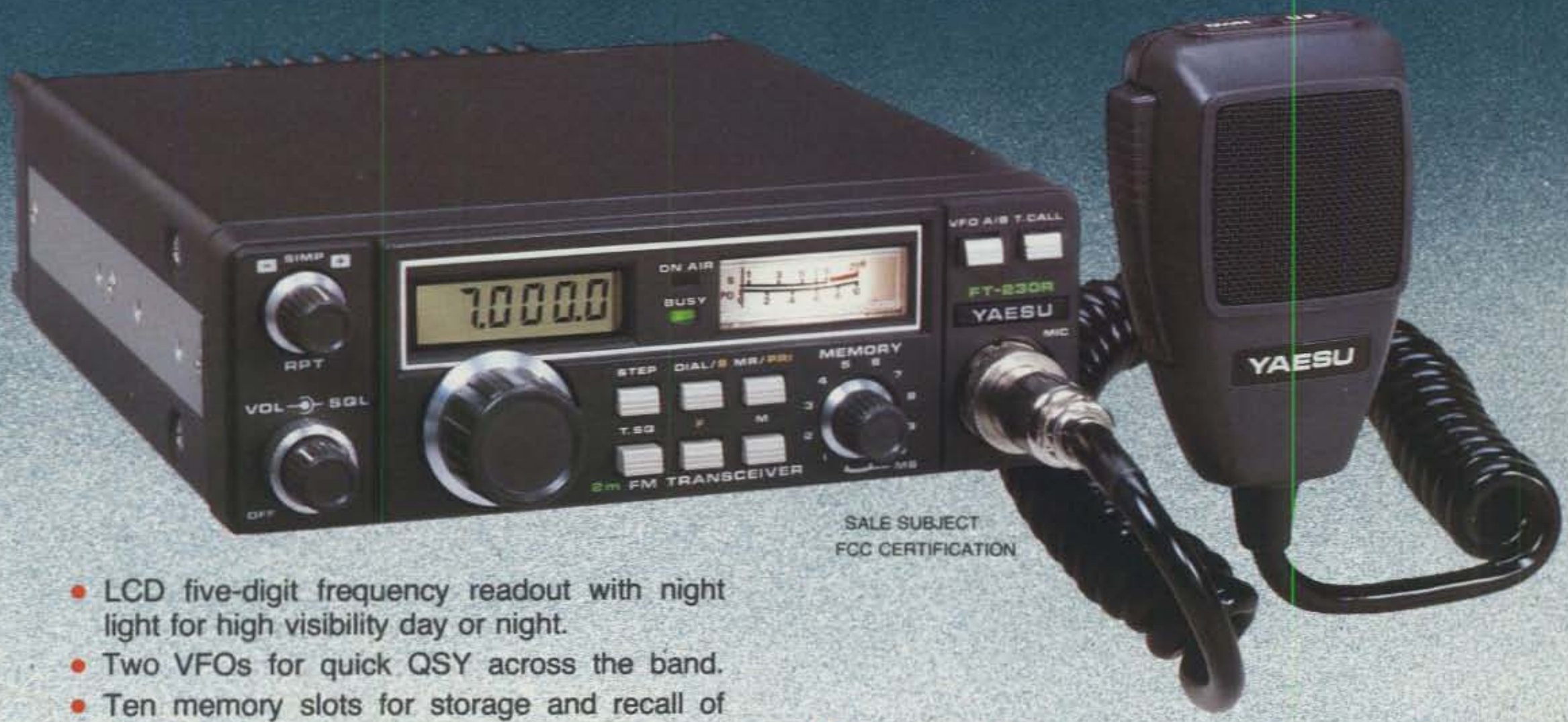

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2 Meters

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YAESU
The radio.

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